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GOVERNMENT REPORTS

ANNOUNCEMENTS & INDEX

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National Technical Information Service

GOVERNMENT REPORTS
ANNOUNCEMENTS & INDEX

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U.S. DEPARTMENT OF COMMERCE
Rogers C. B. Morton, Secretary
NATIONAL TECHNICAL INFORMATION SERVICE
William T. Knox, Director

The Secretary of Commerce has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through March 1, 1978.

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GOVERNMENT REPORTS ANNOUNCEMENTS & INDEX

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(Use Edge Index on back cover to locate subject field in the journal)

FIELD 1. AERONAUTICS. Includes the following Groups: Aerodynamics; Aeronautics; Aircraft, Aircraft Flight Control and Instrumentation; Air Facilities.

FIELD 2. AGRICULTURE. Includes the following Groups: Agricultural Chemistry; Agricultural Economics; Agricultural Engineering; Agronomy and Horticulture; Animal Husbandry; Forestry.

FIELD 3. ASTRONOMY AND ASTROPHYSICS. Includes the following Groups: Astronomy; Astrophysics; Celestial Mechanics.

FIELD 4. ATMOSPHERIC SCIENCES. Includes the following Groups: Atmospheric Physics; Meteorology.

FIELD 5. BEHAVIORAL AND SOCIAL SCIENCES. Includes the following Groups: Administration and Management; Documentation and Information Technology; Economics; History, Law, and Political Science; Human Factors Engineering; Humanities; Linguistics; Man-machine Relations; Personnel Selection, Training, and Evaluation; Psychology (Individual and Group Behavior); Sociology.

FIELD 6. BIOLOGICAL AND MEDICAL SCIENCES. Includes the following Groups: Biochemistry; Bioengineering; Biology; Bionics; Clinical Medicine; Environmental Biology; Escape, Rescue, and Survival; Food, Hygiene and Sanitation; Industrial (Occupational) Medicine; Life Support; Medical and Hospital Equipment; Microbiology; Personnel Selection and Maintenance (Medical); Pharmacology, Physiology; Protective Equipment; Radiobiology; Stress Physiology; Toxicology; Weapon Effects.

FIELD 7. CHEMISTRY. Includes the following Groups: Chemical Engineering; Inorganic Chemistry; Organic Chemistry; Physical Chemistry, Radio and Radiation Chemistry.

FIELD 8. EARTH SCIENCES AND OCEANOGRAPHY. Includes the following Groups: Biological Oceanography; Cartography; Dynamic Oceanography; Geochemistry; Geodesy; Geography; Geology and Mineralogy; Hydrology and Limnology; Mining Engineering; Physical Oceanography; Seismology; Snow, Ice, and Permafrost; Soil Mechanics; Terrestrial Magnetism.

FIELD 9. ELECTRONICS AND ELECTRICAL ENGINEERING. Includes the following Groups: Components; Computers; Electronic and Electrical Engineering; Information Theory; Subsystems; and Telemetry.

FIELD 10. ENERGY CONVERSION (Non-propulsive). Includes the following Groups: Conversion Techniques; Power Sources; Energy Storage.

FIELD 11. MATERIALS. Includes the following Groups: Adhesives and Seals; Ceramics, Refractories, and Glasses; Coatings, Colorants, and Finishes; Composite Materials; Fibers and Textiles; Metallurgy and Metallography; Miscellaneous Materials; Oils, Lubricants, and Hydraulic Fluids; Plastics; Rubbers; Solvents, Cleaners, and Abrasives; Wood and Paper Products.

FIELD 12. MATHEMATICAL SCIENCES. Includes the following Groups: Mathematics and Statistics; Operations Research.

FIELD 13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING. Includes the following Groups: Air Conditioning, Heating, Lighting, and Ventilating; Civil Engineering; Construction Equipment, Materials, and Supplies; Containers and Packaging; Couplings; Fittings, Fasteners, and Joints; Ground Transportation Equipment; Hydraulic and Pneumatic Equipment; Industrial Processes; Machinery and Tools; Marine Engineering; Pumps, Filters, Pipes, Fittings, Tubing, and Valves; Safety Engineering; Structural Engineering.

FIELD 14. METHODS AND EQUIPMENT. Includes the following Groups: Cost Effectiveness; Laboratories, Test Facilities, and Test Equipment; Recording Devices; Reliability; Reprography.

FIELD 15. MILITARY SCIENCES. Includes the following Groups: Antisubmarine Warfare; Chemical, Biological, and Radiological Warfare; Defense; Intelligence; Logistics; Nuclear Warfare; Operations, Strategy, and Tactics.

FIELD 16. MISSILE TECHNOLOGY. Includes the following Groups: Missile Launching and Ground Support; Missile Trajectories; Missile Warheads and Fuses; Missiles.

FIELD 17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES. Includes the following Groups: Acoustic Detection, Communications, Direction Finding; Electromagnetic and Acoustic Countermeasures; Infrared and Ultraviolet Detection; Magnetic Detection; Navigation and Guidance; Optical Detection; Radar Detection; Seismic Detection.

FIELD 18. NUCLEAR SCIENCE AND TECHNOLOGY. Includes the following Groups: Fusion Devices (Thermonuclear); Isotopes; Nuclear Explosions; Nuclear Instrumentation; Nuclear Power Plants; Radiation Shielding and Protection; Radioactive Wastes and Fission Products; Radioactivity; Reactor Engineering and Operation; Reactor Materials; Reactor Physics; Reactors (Power); Reactors (Nonpower); SNAP Technology.

FIELD 19. ORDNANCE. Includes the following Groups: Ammunition, Explosives, and Pyrotechnics; Bombs; Combat Vehicles; Explosions, Ballistics, and Armor; Fire Control and Bombing Systems; Guns; Rockets; Underwater Ordnance.

FIELD 20. PHYSICS. Includes the following Groups: Acoustics; Crystallography; Electricity and Magnetism; Fluid Mechanics; Masers and Lasers; Optics; Particle Accelerators; Particle Physics; Plasma Physics; Quantum Theory; Solid Mechanics; Solid-state Physics; Thermodynamics; Wave Propagation.

FIELD 21. PROPULSION AND FUELS. Includes the following Groups: Air-breathing Engines; Combustion and Ignition; Electric Propulsion; Fuels; Jet and Gas Turbine Engines; Nuclear Propulsion; Reciprocating Engines; Rocket Motors and Engines; Rocket Propellants.

FIELD 22. SPACE TECHNOLOGY. Includes the following Groups: Astronautics; Spacecraft; Spacecraft Trajectories and Reentry; Spacecraft Launch Vehicles and Ground Support.

Sample Entries

Report entries are arranged by COSATI group and field. Within fields they are arranged alphanumerically by Accession (Order) Number - alphabetic data precedes numeric.

AD/A-003 266/4GA PC$6.25/MF$2.25
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
PROJECT THEMIS: A CENTER FOR REMOTE SENSING.
Final rept. 16 Sep 67-15 Sep 73,
F.T. Ulaby, and R.K. Moore, Jun 74, 172p Rept no. CRES-TR-133-29 ETL-CR-74-10
Contract DAAK02-68-C-0089
See also AD-743 234.

Descriptors: *Radar mapping, *Target discrimination, Aerial reconnaissance, Data processing equipment, Preprocessing, Microwaves, Ultrasonic radiation, Image Intensification, Backscattering, Agriculture, Vegetation, Land use, Soils, Scattering, Spectrometry.
Identifiers: Themis project, *Remote sensing.

This report summarizes the technical work accomplished under Project THEMIS, A Center for Remote Sensing at the University of Kansas during the period 16 September 1967 through 15 September 1973. The highlights of the four major areas forming the remote sensing system are presented. A detailed description of the latest radar spectrometer results is presented.

Index entries are arranged alphanumerically. Titles are included in all indexes except Contract Number Index. Sample entries for each index follow:

Subject: Entries are sequenced by major subject term, second paired term, and accession number.

RADAR MAPPING
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI

Personal Author: Entries are sequenced by personal author, report title, and accession number.

MOORE, R. K.
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI

Corporate Author: Entries are sequenced by corporate author name, report number, and accession number. The monitor agency number is given following the report title.

KANSAS UNIV/CENTER FOR RESEARCH INC LAWRENCE REMOTE SENSING LAB
CRES-TR-133-29
Project THEMIS: A Center for Remote Sensing.
(ETL-CR-74-10)
AD/A-003 266/4GI

Contract Grant Number: Entries are sequenced by contract or grant number, corporate author, and accession number.

DAAK02-68-C-0089
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
AD/A-003 266/4GI

Accession/Report Number: Entries are sequenced by accession, report, or monitor agency number. Prices are given in this index.

AD/A-003 266/4GI
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI 8F PC$6.25/MF$2.25

REPORTS ANNOUNCEMENTS

1. AERONAUTICS

1A. Aerodynamics

AD-A016 906/0GA PC$4.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
Application of Marquardt's Nonlinear Least Squares Algorithm to Free-Flight Yaw Data Analysis.
Final memorandum rept.,
James W. Bradley. Sep 75, 54p Rept no. BRL-MR-2526

Descriptors: *Free flight, *Curve fitting, *Computer applications, *Yaw, Partial differential equations, Approximation, Analytic functions, Computer programs, Least squares method, Steepest descent method, FORTRAN.
Identifiers: *Marquardt algorithm.

Marquardt's algorithm is an imporved technique for the least squares estimation of nonlinear parameters. The present report describes the algorithm and documents a FORTRAN subroutine for carrying it out. A specific application of the subroutine is discussed in detail: fitting a complex yaw equation to data obtained from a Free Flight Range. An example is given in which the fitting process converged to the wrong answer without the algorithm and to the right answer with it.

N75-31001/1GA PC$4.00
National Aeronautics and Space Administration, Washington, D.C.
Aeronautical Engineering: A Special Bibliography with Indexes, Supplement 59, July 1975.
Jul 75, 108p NASA-SP-7037(59)

Descriptors: *Aeronautical engineering, *Bibliographies, Abstracts, Aerodynamics.

For abstract, see STAR 1322

N75-31017/7GA PC$3.75/MF$2.25
Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.
Heat Transfer Distributions on a 70 Deg delta Wing with Flap-Induced Separation.
A. J. Edwards. Mar 75, 48p IC-AERO-75-01
Contract MIN-DEF-AT/2037/105

Descriptors: *Boundary layer separation, *Boundary layer transition, *Delta wings, *Hypersonic heat transfer, *Trailing-edge flaps, Angle of attack, Flat plates, Flow measurement, Reynolds number, Schlieren photography, Separated flow, Stanton number, Sweep angle, Transition points, Wind tunnel models.

For abstract, see STAR 1322

N75-31019/3GA PC$3.25/MF$2.25
National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
Some Experiments on the Performance and the Drag Penalty of Various Distributed Roughness Bands Used for Boundary Layer Transition Fixing.
J. J. Versmissen. 10 Jan 74, 21p NLR-TR-74009-U

Descriptors: *Aerodynamic drag, *Boundary layer transition, *Particle size distribution, *Surface roughness, *Transition flow, Airfoils, Carborundum (Trademark), Sprayers, Turbulent wakes, Wind tunnels.

For abstract, see STAR 1322

N75-31053/2GA PC$3.25/MF$2.25
Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.
Estimation of the Aircraft State in Non-Steady Flight.
J. A. Mulder. Oct 74, 22p VTH-M-221
Subm-Submitted for Publication.

Descriptors: *Aircraft performance, *Kalman-schmidt filtering, *Maximum likelihood estimates, *Signal to noise ratios, Accelerometers, Data smoothing, Flight tests, Mathematical models, Onboard equipment, Pressure sensors, V/stol aircraft.

For abstract, see STAR 1322

N75-31054/0GA PC$3.25/MF$2.25
Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.
Advanced Flight Test Instrumentation: Design and Calibration.
R. J. A. W. Hosman. Oct 74, 18p VTH-M-222
Subm-Submitted for Publication.

Descriptors: *Aircraft performance, *Calibrating, *Kalman-schmidt filtering, *Onboard equipment, *Performance tests, Accelerometers, Aircraft control, Aircraft stability, Data reduction, Flight tests, Oscillations, Positioning, Pressure sensors, Temperature measuring instruments, Thrust measurement.

For abstract, see STAR 1322

N75-31378/3GA PC$3.25/MF$2.25
New York Univ., N.Y. ERDA Mathematical and Computing Lab.
Accelerated Iteration Schemes for Transionic Flow Calculations Using Fast Poisson Solvers.
A. Jameson. Mar 75, 20p NASA-CR-143431, COO-3077-82
Contracts NGR-33-016-167, NGR-33-016-201
Subm-Sponsored in Part by Erda.

Descriptors: *Aerodynamics, *Iterative solution, *Poisson equation, *Transonic flow, Airfoils, Angle of attack, Mach number, Operators (Mathematics), Relaxation method (Mathematics), Supersonic flow.

For abstract, see STAR 1322

1B. Aeronautics

AD-A016 342/8GA PC$7.00/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
An Analysis of Alternative Methods of Determining Charges to Users of the Airlift Service Industrial Fund.
Master's thesis,
Dieter Haase, and Donald L. Dereadt. Aug 75, 194p Rept no. SLSR-31-75B

Descriptors: *Military aircraft, *Airlift operations, *Finance, Costs, Management planning and control, User needs, Rates, Computations, Theses.
Identifiers: Alternatives, Tariffs, Demand(Economics), Expenses, Cargo transportation.

The financial aspects of the Military Airlift Command are managed through the Airlift Service Industrial Fund. The system recoups all allowable costs of MAC from the Airlift user via a tariff to maintain a cost/revenue break-even. This analysis has been concerned with the cost the user has to absorb. When airlift demands generate less revenue than required to offset the cost of MAC's minimum flying training program, the tariff is increased. The purpose of this analysis was to determine to what extent the user should pay those costs and to suggest an alternate method that would more equitably distribute the costs.

AD-A016 380/8GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
Analysis of the Variable Behavior Manifested in all Navy/Marine Major Aircraft Accident Rates.
Master's thesis,
John Scott Maxwell, and Laurence Valdimir Stucki. Sep 75, 56p

Descriptors: *Aviation accidents, Naval research, Analysis of variance, Regression analysis, Theory, Performance(Human), Errors, Pilots, Correlation techniques, Variables, Theses, Naval aviation, Marine Corps aviation.
Identifiers: Causal analysis.

All Navy/Marine monthly aircraft accident rates exhibit a behavior of marked variability which cannot be attributed soley to weather or other natural phenomena. Variable measures construed as time dependent were obtained for all major accidents between July 1968 and June 1974. Stepwise linear multiple regression studies relate the variables to accident rates, involving pilot age, daylight pilot flight hours for the 90 days preceding the accident, the number of night carrier landings in the previous 30 days, and the number of daylight carrier landings in the previous 30 days.

AD-A016 764/3GA PC$7.25/MF$2.25
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
Low Visibility Landing Pilot Modeling Experiment and Data, Phase II.
Final rept. Oct-Nov 74,
R. Gressang. Aug 75, 220p Rept no. AFFDL-TR-75-57
Contract DOT-FA70WAI-173

Descriptors: *Aircraft landings, *Performance(Human), Visibility, Simulation, Data acquisition, Performance tests, Questionnaires, Eye movements, Measuring instruments, Computer applications, Approach, Pilots, Mathematical models, Display systems.
Identifiers: Low visibility.

This report describes an experiment to collect data for modeling pilot behavior during low visibility approach and landing. The data are presented in a form suitable for use in forming a pilot model of the optimal control type. The experiment was conducted as a part of Phase 2 of a low visibility landing simulation program (LOVISIM) conducted at the Air Force Flight Dynamics Laboratory and sponsored by the Federal Aviation Administration.

N75-31007/8GA PC$3.75/MF$2.25
Virginia Univ., Charlottesville. Research Labs. for the Engineering Sciences.
Unsteady Loads Due to Propulsive Lift Configurations.
Quarterly Progress Report, 1 Jul. - 30 Sep. 1975.
J. B. Morton, J. K. Haviland, G. D. Catalano, and W. W. Herling. Sep 75, 31p NASA-CR-143454, ESS-4043-108-75
Contract NGR-47-995-219

Descriptors: *Airfoils, *Flow distribution, *Jet flow, *Lift devices, *Unsteady flow, Boundary layer separation, Control surfaces, Flow velocity, Laser applications, Wings.

For abstract, see STAR 1322

N75-31011/0GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Effects of Forward Contour Modification on the Aerodynamic Characteristics of the Naca 641-212 Airfoil Section.
R. M. Hicks, J. P. Mendoza, and A. Bandettini. Sep 75, 76p NASA-TM-X-3293, A-6018

Descriptors: *Aerodynamic characteristics, *Airfoils, *Lift, Leading edges, Low speed, Wing profiles.

For abstract, see STAR 1322

N75-31045/8GA PC$12.50/MF$2.25
Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.
Analytical Evaluation of Ilm Sensors, Volume 1.
Final Report.
R. J. Kirk. Sep 75, 527p NASA-CR-132687-VOL-1, F-2132-VOL-1
Contract NAS1-13489

Descriptors: *Aircraft landing, *Automatic landing control, *Landing aids, *Remote sensors, Interferometry, Microwave landing systems, Microwave radiometers, Radar.

For abstract, see STAR 1322

N75-31732/1GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Conspicuity of Target Lights: The Influence of Flash Rate and Brightness.
M. M. Connors. Sep 75, 17p NASA-TN-D-7961, A-5792

Descriptors: *Aircraft lights, *Brightness, *Collision avoidance, *Pilot performance, *Target recognition, *Visual discrimination, Aircraft accidents, Flight safety, Flight simulation, Human factors engineering, Human reactions, Midair collisions.

For abstract, see STAR 1322

PB-245 581/4GA PC$3.75/MF$2.25
National Transportation Safety Board, Washington, D.C. Bureau of Aviation Safety.
Aircraft Accident Report. Northwest Airlines, Inc., Boeing 727-251, N26 4US, Near Thiells, New York. December 1, 1974.
13 Aug 75, 32p NTSB-AAR-75-B, File-1-0031

Descriptors: *Aviation accidents, *Accident investigations, Stalling, Descent, Angle of attack indicators, Flight instruments, Airspeed indicators, Crash landing, Commercial aircraft.
Identifiers: Boeing 727 aircraft, DOT/5A, DOT/4DZ/DA.

About 1926 e.s.t. on December 1, 1974, Northwest Airlines Flight 6231, a Boeing 727-251, crashed about 3.2 nmi west of Thiells, New York. The accident occurred about 12 minutes after the flight had departed John F. Kennedy International Airport, Jamaica, New York, and while on a ferry flight to Buffalo, New York. Three crewmembers, the only persons aboard the aircraft, died in the crash. The aircraft was destroyed. The aircraft stalled at 24,800 feet m.s.l. and entered an uncontrolled spiralling descent into the ground. Throughout the stall and descent, the flightcrew did not recognize the actual condition of the aircraft and did not take the correct measures necessary to return the aircraft to level flight. Near 3,500 feet m.s.l., a large portion of the left horizontal stabilizer separated from the aircraft, which made control of the aircraft impossible. The National Transportation Safety Board determines that the probable cause of this accident was the loss of control of the aircraft because the flightcrew failed to recognize and correct the aircraft's high-angle-of-attack, low-speed stall and its descending spiral.

PB-245 582/2GA PC$3.75/MF$2.25
National Transportation Safety Board, Washington, D.C. Bureau of Aviation Safety.
Aircraft Accident Report Montana Power Company Rockwell Turbo Commander 690A, N40MP and USAF F-111A, 77-055 Near Kingston, Utah, November 12, 1974.
1 Aug 75, 30p NTSB-AAR-75-12, File-3-4107

Descriptors: *Aviation accidents, *Accident investigations, Collision research, Level flight, Aircraft collisions, Inflight refueling.
Identifiers: Turbo Commander 690 aircraft, F-111A aircraft, DOT/5A, DOT/4DZ/DA, F-111 aircraft.

About 1804 m.s.t., on November 12, 1974, a United States Air Force (USAF) F-111A, 77-055, and a Montana Power Company, Rockwell Turbo Commander, Model 690A, N40MP, collided in flight near Kingston, Utah. The F-111A was the lead aircraft in a formation of two F-111A's. The formation was attempting a rendezvous with a USAF KC-135 for night air refueling training when the planes collided. The pilot of N40MP, the sole occupant, was killed. The two crewmembers of the F-111A ejected successfully from their aircraft. Both aircraft were destroyed by the collision, the postcollision fire, and impact with the ground. The National Transportation Safety Board determines that the probable cause of this accident was the F-111A pilot's misidentification of the Turbo Commander as a refueling tanker with which he intended to rendezvous. Contributing to the misidentification was his failure to use prescribed procedures and techniques during rendezvous with a tanker aircraft for refueling.

PB-245 583/0GA PC$3.25/MF$2.25
National Transportation Safety Board, Washington, D.C. Bureau of Aviation Safety.
Aircraft Accident Report. Golden West Airlines, Inc., De Havilland DHC-6, N6383 and Cessnair Aviation, Inc., Cessna 150, N11421, Whittier, California January 9, 1975.
7 Aug 75, 24p NTSB-AAR-75-14, File-3-1941

Descriptors: *Aviation accidents, *Accident investigations, Aircraft collisions, Level flight, Casualties, Damage, Collision research, Aviation safety, Short takeoff aircraft, Passenger aircraft.
Identifiers: Twin otter aircraft, Cessna 150 aircraft, DOT/5A, DOT/4DZ/DA.

Golden West Airlines, Inc., Flight 261, a De Havilland Twin Otter, and a Cessnair Aviation, Inc., Cessna 150 collided in flight near Whittier, California. The accident occurred during daylight hours, at approximately 4:07 p.m., P.s.t., January 9, 1975. Both aircraft were destroyed by the collision and subsequent ground impact. The 10 passengers and 2 crewmembers on the Twin Otter, and the instructor pilot and student pilot of the Cessna 150 were killed. Falling wreckage inflicted substantial damage to houses and lawns in the area of the collision, but there were no reported injuries to persons on the ground. The National Transportation Safety Board determines that the probable cause of the accident was the failure of both flightcrews to see the other aircraft in sufficient time to initiate evasive action.

PB-245 771/1GA PC$12.25/MF$3.25
National Transportation Safety Board, Washington, D.C. Bureau of Aviation Safety.
Aircraft Accident Reports. Brief Format U.S. Civil Aviation Issue Number 1 of 1975 Accidents.
4 Sep 75, 523p NTSB-BA-75-4

Descriptors: *Aviation accidents, *Civil aviation, Statistical analysis, Accident investigations, Collision research, Casualties, Damage, Aviation safety.
Identifiers: DOT/5A, DOT/4DZ/DA.

The publication contains selected aircraft accident reports, in brief format, occurring in U.S. civil aviation operations during calendar year 1975. The 896 General Aviation accidents contained in this publication represent a random selection. The publication is issued irregularly, normally five times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by type of accident, phase of operation, kind of flying, injury index, aircraft damage, conditions of flight, pilot certificate, injuries, and causal factors.

1C. Aircraft

AD-A016 393/1GA PC$5.75/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
An Evaluation of the Operational Capabilities and Fuel Conservation Implications of Using Remotely Piloted Vehicles, Advanced Aircraft Flight Simulators, and Lighter-Than-Air Aircraft.
Master's thesis,
Kenneth P. O'Gorman, Richard L. Johnston, and Arthur E. Schwaninger. Aug 75, 148p Rept no. SLSR-37-75B

Descriptors: *Remotely piloted vehicles, *Airships, *Fuel consumption, Flight simulators, Energy conservation, Mission profiles, Feasibility studies, Theses.
Identifiers: *Fuel conservation.

As early as 1950, the current world fuel energy crisis was predicted to occur. However, the warnings went unheeded until the oil embargo was initiated in 1973. Due to the resulting high cost and limited availability, the petroleum users of the world have attempted measures to conserve the use of fuel. In the United States, the Federal Government, specifically the Department of Defense, has implemented various measures and studies to reduce fuel consumption. This thesis researched literature in three areas--remotely piloted vehicles, advanced aircraft simulators, and lighter-than-air aircraft--to explore their operational capabilities and to evaluate any fuel energy benefits that may be derived from their use. The thesis concludes that remotely piloted vehicles and advanced aircraft flight simulators can be utilized to meet various operational requirements while reducing fuel consumption. However, lighter-than-air aircraft designs do not currently possess the technology needed to accomplish operational requirements while reducing fuel consumption.

AD-A016 408/7GA PC$9.50/MF$2.25
General Dynamics/Convair San Diego Calif
Weapon System Costing Methodology for Aircraft Airframes and Basic Structures. Volume I. Technical Volume.
Final rept. Jul 72-Mar 75,
R. E. Kenyon. Jun 75, 341p AFFDL-TR-75-44-Vol-1
Contract F33615-72-C-2083
See also Volume 2, Part 1, AD-A016 409.

Descriptors: *Airframes, *Cost estimates, Methodology, Trade off analyses, Assembly, Fabrication, Weight, Ribs, Spars, Coverings, Structural members, Skin(Structural), Leading edges, Trailing edges, Systems analysis, Fabrication, Computer programs, Data acquisition, Data processing, Data bases, Cost analysis, Costs.
Identifiers: *Cost estimating relationships.

This volume provides a detailed description of the function and use of two weapon system costing methodologies for aircraft airframes and basic structures developed for the Air Force Flight Dynamics Laboratory for use in conceptual and preliminary designs phases of weapon system development. The methods are a trade study costing method for detailed cost analysis of trades-off between weight, cost,

type of construction and type of material and a system costing method for determining the projected cost of a complete airframe within the context of a weapon system development. This volume provides a technical discussion of method development. Tradeoff capability has been provided for a range of alternative structure and material combinations. A technique for independently assessing complexity factors has been developed and demonstrated. Manufacturing costs are separately estimated for the primary elements of substructure: ribs, spars, covers, leading edges, trailing edges, tips, etc. The trade study method provides an iterative capability stemming from a direct interface with design synthesis programs. A detailed cost data base and system for data expansion is provided. The methods are designed for ease in changing cost estimating relationships and estimating coefficients resulting from cost data update. (Author)

AD-A016 409/5GA PC$7.00/MF$2.25
General Dynamics/Convair San Diego Calif
Weapon System Costing Methodology for Aircraft Airframes and Basic Structures. Volume II. Estimating Handbook and User's Manual. Part I.
Final rept. Jul 72-Feb 75,
R. E. Kenyon. May 75, 283p AFFDL-TR-75-44-Vol-2-Pt-1
Contract F33615-72-C-2083
See also Volume 2, Part 2, AD-A016 410.

Descriptors: *Airframes, *Cost estimates, Instruction manuals, Methodology, Trade off analyses, Weight, Ribs, Spars, Coverings, Leading edges, Trailing edges, Skin(Structural), Assembly, Fabrication, Systems analysis, Computer programs, Data acquisition, Data processing, Data bases, Files(Records), Cost analysis, Costs, Handbooks.
Identifiers: *Cost estimating relationship.

This volume provides a detailed description of the function and use of two weapon system costing methodologies for aircraft airframes and basic structures developed for the Air Force Flight Dynamics Laboratory for use in conceptual and preliminary designs phases of weapon system development. The methods are a trade study costing method for detailed cost analysis of trades-off between weight, cost, type of construction and type of material and a system costing method for determining the projected cost of a complete airframe within the context of a weapon system development. This volume describes how to make an estimate using either technique and shows the results of a demonstration case. Tradeoff capability has been provided for a range of alternative structure and material combinations. A technique for independent assessing complexity factor has been developed and demonstrated. Manufacturing costs are separately estimated for the primary elements of substructure: ribs, spars, covers, leading edges, trailing edges, tips, etc. The trade study method provides an iterative capability stemming from a direct interface with design synthesis programs. A detailed cost data base and system for data expansion is provided. The methods are designed for ease in changing cost estimating relationships and estimating coefficients resulting from cost data update. (Author)

AD-A016 410/3GA PC$10.00/MF$2.25
General Dynamics/Convair San Diego Calif
Weapon System Costing Methodology for Aircraft Airframes and Basic Structures Volume II - Estimating Handbook and User's Manual, Part II.
Final rept. Jul 72-Feb 75,
R. E. Kenyon. May 75, 366p AFFDL-TR-75-44-Vol-2-Pt-2
Contract F33615-72-C-2083
See also Volume 1, AD-A016 408.

Descriptors: *Airframes, *Cost estimates, *Computer programs, Costs, Methodology, Trade off analyses, Cost analysis, Weight, Construction, Materials, Ribs, Spars, Coverings, Leading edges, Trailing edges, Aerodynamic configurations, Computerized simulation, Input, Time sharing, Data bases, User needs, Manuals, Tables(Data), Graphs.
Identifiers: Cost estimating relationships, COSTC computer program.

This volume provides a detailed description of the function and use of two weapon system costing methodologies for aircraft airframes and basic structures developed for the Air Force Flight Dynamic Laboratory for use in conceptual and preliminary designs phases of weapon system development. The methods are a trade study costing method for detailed cost analysis of trades-off between weight, cost, type of construction and type of material and a system costing method for determing the projected cost of a complete airframe within the context of a weapon system development. This volume describes how to make an estimate using either technique and shows the results of a demonstration case. Tradeoff capability has been provided for a range of alternative structure and material combinations. A technique for independent assessing complexity factor has been developed and demonstrated. Manufacturing costs are separately estimated for the primary elements of substructure: ribs, spars, covers, leading edges, trailing edges, tips, etc. The trade study method provides an iterative capability stemming from a direct interface with design synthesis programs. A detailed cost data base and system for data expansion is provided. The methods are designed for ease in changing cost estimating relationships and estimating coefficients resulting from cost data update. (Author)

AD-A016 441/8GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
A Comparison of Optimal Control Theory Predictions with Actual Pilot Performance in a Helicopter Longitudinal Tracking Task.
Master's thesis,
Luther William Wheat. Jun 75, 44p

Descriptors: *Flight control systems, *Flight simulators, *Helicopters, Approach, Aircraft landings, Cockpits, Display systems, Cathode ray tube screens, Low velocity, Performance(Human), Tracking, Performance tests, Pilots, Mathematical models, Theses.

A fixed base helicopter simulation was implemented which may be easily altered to represent a variety of conventional single rotor aircraft. Test subjects performed 90-second tracking tasks utilizing two cockpit displays for longitudinal control during landing approach. The performance data generated were compared with predicted values from an optimal pilot modeling technique. Tentative conclusions were drawn as to the effectiveness of each display as well as the predictive power of the pilot model.

AD-A016 478/0GA MF$2.25
Aerospace Guidance and Metrology Center Newark Air Force Station Ohio
Avionics Proliferation: A Life Cycle Cost Perspective.
Final rept.,
Russell M. Genet , and Thomas D. Meitzler. 30 Jul 75, 30p Rept no. AGMC-75-002
Availability: Available in microfiche only.

Descriptors: *Avionics, *Life cycle costs, *Inertial navigation, Economic analysis, Cost effectiveness, Military aircraft.

The paper discusses proliferation and when it can occur. It specifically iooks at the economic question of when can it be cost effective to use an existing military inertial navigation system for new aircraft rather than developing and using a new system. The discussion is from a life cycle cost viewpoint with particular attention to the 'start-up' costs. Attached with the paper is a complete reproduction of the input data and computer results used.

AD-A016 714/8GA PC$3.25/MF$2.25
Advisory Group for Aerospace Research and Development Paris (France)
Structural Response to Impact Damage.
Conference proceedings,
Jurgen Massmann. Sep 75, 23p Rept no. AGARD-R-633
NATO furnished.

Descriptors: *Airframes, *Projectiles, *Impact, *Structural response, Impact strength, Predictions, Damage assessment, Vulnerability, Terminal ballistics, Finite element analysis, NATO.

The complex problem of designing an aircraft structure in a manner to minimize its vulnerability to the impact damage of projectiles has always been a major concern of aircraft builders. This report gives an excellent description of the vulnerability assessment of aircraft structures to projectile threats, including high explosive munitions. It defines the major elements of a structural vulnerability assessment, including development of the damage model, the strength model, and parameter sensitivity effects. Considerable experimental verification is included.

AD-A016 853/4GA PC$5.25/MF$2.25
West Virginia Univ Morgantown Dept of Aerospace Engineering
Experimental Investigation of a Circulation Controlled Shrouded Propeller,
Richard E. Walters, and Jeffrey C. Ashworth. Feb 74, 113p Rept no. TR-39
Contract N00014-68-A-0512

Descriptors: *Shrouded propellers, *Thrust, Circulation, Control, Airfoils, Blowers, Trailing edges, Test methods, Propeller blades, Pitch(Inclination), Velocity, Torque, Pressure.
Identifiers: Blowing.

A preliminary experimental investigation was made on a 14.18 inch inside diameter, ten inch long, symmetrical airfoil shaped shroud equipped with blowing slots on a blunt semicircular trailing edge. The purpose of the investigation was to determine the effect of circulation control on the thrust of the shroud-propeller combination. Static tests were performed at three propeller blade pitch angles, three propeller speeds and three levels of inside slot blowing rates. Data recorded consisted of the propeller thrust and torque, shroud static pressures, total pressure in front of the inside struts, and total pressure at the blowing slot. Static pressure data was reduced to coefficient form and integrated to obtain thrust and normal force coefficients. This was converted to pounds and compared with the propeller thrust.

AD-A016 885/6GA PC$3.75/MF$2.25
Army Aeromedical Research Lab Fort Rucker Ala
Buettner Cueing Concept for Helicopter Flight Control.
Final rept.,
Robert H. Wright. Aug 75, 29p Rept no. USAARL-76-2

Descriptors: *Flight control systems, *Helicopters, *Night vision devices, *Cueing, Transfer of training, Students, Pilots, Instrument flight, Approach indicators, Markers, Windshields, Visual aids, Night flight.
Identifiers: *Buettner cueing concepts.

Familiarization was obtained with a helicopter flight control cueing concept developed by a retiring senior flight instructor, with emphasis on its potential application to night vision imaging systems. It consisted of a simple set of windshield marks arranged to provide precision in contact control of pitch attitudes. Students trained with it seemed to find advanced contact and instrument training much easier than traditionally trained students, and experienced helicopter pilots introduced to the concept felt it provided substantial improvement in their control precision. Conclusions from this exploratory familiarization were that Buettner-type cue sets (a) have potential for reducing perceptual ambiguities in helicopter control with night vision devices, (b) increase precision and lead in helicopter contact control, (c) should provide a high level of transfer to instrument training, (d) with slight extension have potential as an approach aid, particularly for an underslung night vision device, and (e) appear to have potential for very simple helicopter simulator visual displays that should have considerable value for initial of transition training. (Author)

AD-A016 921/9GA PC$4.25/MF$2.25
Army Air Mobility Research and Development Lab Fort Eustis Va Eustis Directorate
Flight Test of the Aerospatiale SA-342 Helicopter,
Duane R. Simon, and Jimmie C. Savage. Aug 75, 74p Rept no. USAAMRDL-TR-75-44

Descriptors: *Helicopters, *Flight testing, Tail helicopter rotors, Stability, Flight maneuvers, Hovering.
Identifiers: SA-342 aircraft, Fan in fin configurations, Handling qualities.

The Eustis Directorate of the U.S. Army Air Mobility Research and Development Laboratory conducted an evaluation of the Aerospatiale Model SA-342 during November 1974. A total of 10 hours 20 minutes of flight time was accumulated during give test flights. Performance, stability, and control tests were performed to evaluate the increased capabilities of the SA-342 over the SA-341 upon which the design of the SA-342 is based. Both helicopters have fan-in-fin type antitorque control. The SA-342's handling qualities wwere generally very good, and it fin type antitorque control. The SA-342's handling qualities ere generally very good, and it exhibited improved lateral-directional stability over the SA-341; however, trimming the aircraft directionally within the 'sideslip deadband' was still difficult. The improved fan provided sufficient control moment to attain 50 knots in sideward flight. It is recommended that additional effort be expended to explore and resolve problems with the fan-in-fin design experimental both by Aerospatiale and by Sikorsky Aircraft.

AD-A016 925/0GA PC$4.25/MF$2.25
Ohio State Univ Columbus Dept of Mechanical Engineering
Investigation of Accelerated Life Prediction Techniques.
Final rept. 1 Mar 74-28 Feb 75,
Jack A. Collins, and Ben Tarver Hagan, Jr. Oct 75, 59p USAAMRDL-TR-75-38
Contract DAAJ02-74-C-0033

Descriptors: *Helicopters, *Life tests, *Accelerated testing, Fretting, Wear, Failure(Mechanics), Predictions, Damage assessment.
Identifiers: *Failure analysis, H-1 aircraft, UH-1H aircraft.

The objectives of the work reported were to define potentially useful failure prediction models for the wear and fretting-wear modes of failure, to define the parameters of primary importance, to incorporate the concept of accelerated testing both in the prediction models and in the design of a testing program, and to design special testing machines capable of both real-time and accelerated-wear and fretting-wear tests using a UH-1H helicopter cyclic servo support bearing as the test specimen. This particular component was selected because it was a relatively simple example of an actual component in which both wear and fretting-wear failure modes had been regularly observed in the field.

AD-A016 929/2GA PC$4.75/MF$2.25
Lockheed-California Co Burbank
Increased Rotor Blade Survivability.
Final rept. 1 Jul 73-1 Jul 75,
C. F. Griffin. Aug 75, 88p Rept no. LR-26700 USAAMRDL-TR-75-6
Contract DAAJ02-73-C-0101

Descriptors: *Helicopter rotors, *Rotor blades(Rotary wings), *Vulnerability, Composite materials, Graphite, Epoxy resins, Ballistic testing, Damage assessment, Geodesics, Computer programs, Fiber reinforced composites.
Identifiers: *Survivability, H-56 aircraft, AH-56A aircraft, Carbon fiber reinforced plastics, Graphite reinforced composites, Epoxy matrix composites.

Reported are results of a program to investigate the feasibility of using composite geodesic structure for the blade spar to increase survivability of helicopter main rotor blades. The design investigated consists of a geodesic truss structure spare of elliptical cross section comprised of elements forming a redundant gridwork. This spar is covered with a thin composite expendable skin that forms the airfoil contour. Parametric analyses were conducted to determine the effects of geometry and materials on the strength and stiffness of geodesic structures. Subscale sections of the graphite/epoxy geodesic main rotor blade box spar were fabricated and tested. A graphite/epoxy geodesic helicopter main rotor blade preliminary design was completed, and four full-scale segments of this blade were fabricated and subjected to structural and ballistic tests.

AD-A016 932/6GA PC$5.75/MF$2.25
Honeywell Inc Minneapolis Minn Government and Aeronautical Products Div
Roll-Axis Hydrofluidic Stability Augmentation System Development.
Final rept. 29 Mar 73-30 Sep 74,
Darroll Bengtson, Thomas Dickovich, and Robert Helfenstine. Sep 75, 137p Rept no. GAPD-W0528-FR USAAMRDL-TR-75-43
Contract DAAJ02-73-C-0056

Descriptors: *Helicopters, *Flight control systems, Hydraulic equipment, Stability, Augmentation, Analog simulation, Mathematical models, Roll, Damping, Yaw, Flight testing, Hovering, Questionnaires, Performance(Engineering), Fluidics.
Identifiers: OH-58 aircraft, OH-58A aircraft, Hydrofluidics, Stability augmentation systems.

The objective of this program was to develop, design, and flight test a roll-axis Hydrofluidic Stability Augmentation System (HYSAS) for the OH-58A helicopter. The system, when used with a yaw HYSAS, provides increased vehicle damping which improves the handling characteristics. Flight test evaluations were performed with satisfactory results.

N75-31003/7GA PC$3.75/MF$2.25
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Aspects of Non-Destructive Inspection in Relation to Service Failure Analysis.
E. A. B. Degraaf. 3 Feb 75, 39p NLR-MP-75005-U

Descriptors: *Aircraft maintenance, *Aircraft parts, *Effectiveness, *Failure analysis, *Nondestructive tests, Acceptability, Checkout, Correlation detection, Examination, Failure modes, Fluids, Life (Durability), Reliability, X ray inspection.

For abstract, see STAR 1322

N75-31041/7GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Survey of Projected Growth and Problems Facing Air Transportation, 1975 - 1985.
L. J. Williams, and A. Wilson. Aug 75, 16p NASA-TM-X-62476

Descriptors: *Air transportation, *Forecasting, *Surveys, Economic factors, Fuel consumption, Law (Jurisprudence), Payloads.

For abstract, see STAR 1322

N75-31051/6GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Wind Tunnel/Flight Data Correlation for the Boeing 737-100 Transport Airplane.
F. J. Capone. Aug 75, 18p NASA-TM-X-72715

Descriptors: *Boeing 737 aircraft, *Data correlation, *Transport aircraft, *Wind tunnel tests, Flight tests, Subsonic aircraft.

For abstract, see STAR 1322

N75-31052/4GA PC$4.25/MF$2.25
Aeronautical Research Labs., Melbourne (Australia).
An Investigation of the Fatigue Performance of Three Types of Aircraft Skin/Spar Boom Fastening Systems. Part 1: Constant-Amplitude Fatigue Tests.
J. Y. Mann, and F. G. Harris. Sep 74, 55p ARL/SM-REPT-350-PT-1

Descriptors: *Fasteners, *Fatigue tests, *Service life, *Wings, Crack initiation, Fracture strength, Load tests, Rivets, Screws, Skin (Structural member).

For abstract, see STAR 1322

PAT-APPL-492 370/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Selective Rotor Blade Severing Apparatus.
Patent Application,
Marvin J. Foral. Filed 29 Jul 74, 10p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Helicopter rotors, *Rotor blades(Rotary wings), *Self destruct devices, Patents, Explosive actuators, Jettisonable equipment.
Identifiers: *Patent applications, PAT-CL-416-2.

The patent application relates to an emergency rotor blade disconnect system for at least two paris of opposing helicopter rotor blades. A plurality of parallel wires are embedded in each blade and electrically connected to an explosive squib-actuated rotor blade severing means at the rotor hub. Breakage of one of the rotor blades along its length initiates an electrical circuit to disconnect the remaining portion thereof from the rotor hub, and also to disconnect the blade opposite to said one blade in order to maintain rotor balance and avoid excessive rotor vibration.

PAT-APPL-597 869/GA PC$3.25/MF$2.25
Department of the Navy Washington D C

Dual Ejector Stores Attitude Control System.
Patent Application,
Lloyd J. Holt, and Clayton Paniaqui. Filed 21 Jul 75, 12p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *External stores, *Ejectors, Suspension devices, Release mechanisms, Extendable structures, Optimization, Safety, Delivery, Patents, Jettisonable equipment, Hydraulic actuators, Control systems.
Identifiers: *Patent applications, PAT-CL-244-127-R, Dual systems.

The patent application describes an aircraft stores suspension and release device including extendible means for forcibly ejecting an attached store. The extendible means are hydraulically actuated and dependently connected for positive control and the degree of extension of each extendible means is independently adjustable. The extendible means may be connected together by mechanical or hydraulic linkage which may be gas, hydraulically or mechanically operated.

PATENT-3 823 901 Not available NTIS
Department of the Navy Washington D C
Aerial Launch System.
Patent,
Karl A. Holmes, James R. Knepshield, and Dale E. Knutsen. Filed 24 Jul 73, patented 16 Jul 74, 3p Rept nos. PAT-APPL-382 238,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Helicopters, *Air drop operations, *Platforms, *Patents, Launchers, Frames, Struts, Fastenings.
Identifiers: PAT-CL-244-118-R.

The patent relates to a device whereby a launcher support structure is provided for a helicopter installation which may be quickly and easily installed or removed. The primary structural members extend across the floor of the helicopter and out a doorway. These members are attached to the helicopter structure at the door sill using existing hardware. A compression strut between the launcher structural members and overhead helicopter structure is used in the helicopter cabin and tension rods are extended from the extreme outboard ends of the structure to the fore and aft helicopter tie-down rings.

1D. Aircraft Flight Control and Instrumentation

AD-A016 532/4GA PC$7.25/MF$2.25
Intermetrics Inc Cambridge Mass
Contract End Item Detail Specification. Volume I. Part II. Computer Program Detailed Technical Description CEI-11-72-B Post-Flight Processor for CIRIS.
7 May 74, 208p
Contracts F29601-72-C-0005, F29601-73-C-0089
See also Volume 2, AD-016 533.

Descriptors: *Processing equipment, *Flight instruments, *Computer programming, *Specifications, Flight recorders, Data acquisition, Data bases, Subroutines, Navigation, Errors.
Identifiers: CIRIS program.

This CEI Specification Part II defines all of the computer programs which comprise the Post Flight Processor for CIRIS. This revision, dated 7 May 1974, is in agreement with the Post Flight Processor as delivered to the Air Force on 7 May 1974 for acceptance testing. The CEI Specification Part 2 is divided into three volumes. Volume I contains general material and specifies the Raw Flight Data Tape Editor, the Parameter File Tape Generator, the Post-Flight Processor Control Module, and the Job Control Card Processor.

AD-A016 533/2GA PC$9.25/MF$2.25
Intermetrics Inc Cambridge Mass
Contract End Item Detail Specification. Volume II. Part II. Computer Program Detailed Technical Description CEI-11-72-B Post-Flight Processor for CIRIS.
7 May 74, 303p
Contracts F29601-72-C-0005, F29601-73-C-0089
See also Volume 1, AD-A016 533, and Volume 3, AD-A016 534.

Descriptors: *Processing equipment, *Flight instruments, *Kalman filtering, *Specifications, Flight recorders, Data acquisition, Data bases, Computer programming, Subroutines, Navigation, Errors.
Identifiers: CIRIS program.

This CEI Specification Part 2 defines all of the computer programs which comprise the Post Flight Processor for CIRIS. This revision, dated 7 May 1974, is in agreement with the Post Flight Processor as delivered to the Air Force on 7 May 1974 for acceptance testing. The CEI Specification Part II is divided into three volumes. Volume 2 specifies the Forward Filter.

AD-A016 534/0GA PC$7.50/MF$2.25
Intermetrics Inc Cambridge Mass
Contract End Item Detail Specification. Volume III. Part II. Computer Program Detailed Technical Description CEI-II-72-B Post-Flight Processor for CIRIS.
7 May 74, 231p
Contracts F29601-72-C-0005, F29601-73-C-0089
See also Volume 2, AD-A016 533.

Descriptors: *Processing equipment, *Flight instruments, *Kalman filtering, *Specifications, Flight recorders, Data acquisition, Data bases, Computer programming, Subroutines, Navigation, Errors.
Identifiers: CIRIS program.

This CEI Specification Part II defines all of the computer programs which comprise the Post Flight Processor for CIRIS. This revision, dated 7 May 1974, is in agreement with the Post Flight Processor as delivered to the Air Force on 7 May 1974 for acceptance testing. The CEI Specification Part 2 is divided into three volumes. Volume 3 specifies the Backward Filter and Smoother, and contains acceptance test specifications and general analytical material.

1E. Air Facilities

AD-A016 428/5GA PC$4.25/MF$2.25
New Mexico Univ Albuquerque Eric H Wang Civil Engineering Research Facility
AFPAV Computer Code for Structural Analysis of Airfield Pavements.
Final rept.,
John P. Nielsen. Oct 75, 75p AFWL-TR-75-151
Contract F29601-74-C-0030

Descriptors: *Pavements, *Landing fields, *Computer programs, *Stress analysis, Linear systems, Nonlinear systems, Finite element analysis, Flow charting, Input, Stresses, Structural properties, Shear stresses, Computer graphics, Computerized simulation, Mathematical models.
Identifiers: AFPAV computer code.

This report is a user's manual for the implementation and use of the AFPAV computer code for the structural analysis of airfield pavements. The code provides for linear and nonlinear material properties and stress analyses for single and multiwheel aircraft. A plot routine is included in AFPAV to provide for a graphical presentation of the computed data. (Author)

AD-A016 498/8GA PC$4.75/MF$2.25
Naval Civil Engineering Lab Port Hueneme Calif
A Structural Evaluation of Rapid Methods of Backfilling for Bomb Damage Repair - Phase II.
Final rept. Apr 73-Aug 74,
John Crawford, and James B. Forrest. Aug 75, 88p AFWL-TR-74-272
See also report dated Mar 74, AD-780 104.

Descriptors: *Bombs, *Craters, *Runways, *Backfills, Landing fields, Bomb damage, Materials, Field tests, Computerized simulation, Finite element analysis.

An analytical model for evaluating the performance of repair systems for bomb-damaged runways is presented. This model consists of a finite element computer code capable of predicting the response of a repaired crater to an applied single wheel load, placed at the center of the repaired surface. Variables investigated during development of the analytical model include different element meshes, number of load steps, material stiffnesses and tension cutoff levels. Background information dealing with application of the model and generation of its input is included. Verification of this prediction technique is presented, based upon experimental testing of repaired model craters and repaired prototype 750-pound bomb craters. The prototype crater was repaired using the procedure recommended in Air Force Manual 93-2. The analytical model is shown to give valid predictions of the repair system response as long as reasonable attention is directed toward generation of input information.

AD-A016 900/3GA PC$7.00/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Lake Erie International Jetport Model Feasibility Investigation. Report 17-3 Longshore Wave Energy Analyses.
Technical rept.,
Douglas G. Outlaw, and Donald L. Durham. Sep 75, 181p Rept no. AEWES-TR-H-74-6-17-3
See also report dated Apr 75, AD-A009 729.

Descriptors: *Airports, *Site selection, Offshore, Lakes, Feasibility studies, Lake waves, Height, Statistical distributions, Surveys, Energy levels, Wave propagation, Ohio.
Identifiers: *Lake Erie, Cleveland(Ohio), Water wave energy.

The Lake Erie Regional Transportation Authority (LERTA) is conducting a feasibility and site selection study for a major hub airport in the Cleveland Area. One of the possible sites being evaluated is an offshore site in Lake Erie near Cleveland, Ohio. As a part of the feasibility analysis of an offshore site, the U.S. Army Engineer Waterways Experiment Station (WES) is conducting a model feasibility investigation. This report, which is the third of a series, presents results of the longshore wave energy analyses.

N75-31046/8GA PC$5.25/MF$2.25
Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.
Analytical Evaluation of Ilm Sensors. Volume 2: Appendices.
R. J. Kirk. Sep 75, 112p NASA-CR-132687-VOL-2
Contract NAS1-13489

Descriptors: *Aircraft landing, *Automatic landing control, *Landing aids, *Remote sensors, Computer programs, Interferometry, Microwave landing systems, Microwave radiometers, Radar.

For abstract, see STAR 1322

2. AGRICULTURE

2C. Agricultural Engineering

N75-31554/9GA PC$6.25/MF$2.25
Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
Research in Remote Sensing of Agriculture, Earth Resources, and Man'S Environment.
Final Report.
D. A. Landgrebe. 1975, 166p NASA-CR-144426
Contract NAS9-14016

Descriptors: *Agriculture, *Earth resources, *Remote sensors, Algorithms, Crop identification, Data processing, Data reduction, Land use, Landsat satellites, Multispectral band scanners, Soil mapping.

For abstract, see STAR 1322

PB-245 762/0GA PC$3.25/MF$2.25
Oklahoma State Univ., Stillwater. Dept. of Agricultural Engineering.
Improvement of Water Application of Self-Propelled Sprinkler Irrigation Systems.
Final technical completion rept. 1 Jul 72-30 Jun 75,
A. D. Barefoot. Jun 75, 19p W76-00200, OWRT-A-040-OKLA(1)
Contract DI-14-31-0001-4036

Descriptors: *Sprinkler irrigation, Test methods, Performance evaluation, Trafficability, Soil properties, Evapotranspiration, Field tests, Clay soils, Loams, Oklahoma.

The number of center-pivot sprinkler irrigation systems is increasing in the central Great Plains. The reasons for this increase are their labor-saving advantages and versatility. The system's ability to irrigate rolling terrain with a wide range of application depths accounts for its versatility. The objectives of this project were to evaluate the depth and uniformity of application of a center-pivot system and to determine the depth of water stored in the crop root zone, evaporation losses and trafficability problems of a typical system during field conditions. Data were collected from a 1300 foot, electrically driven system. Both size and spacing of the nozzle heads are varied to obtain desired application rates on this system. The soil type was sand and the crop was peanuts. Five systems were tested in the Oklahoma Panhandle. The systems varied in both design and lengths. Three of the systems were electrically powered and two were water driven. The average coefficient of uniformity for the five systems was 81.7. Only minor traction problems were observed in the clay loam or loam soils.

2E. Animal Husbandry

AD-A016 552/2GA PC$3.25/MF$2.25
Armed Forces Inst of Pathology Washington D C
Case for Diagnosis,
G. Migaki. 1975, 2p
Availability: Pub. in Military Medicine, v140 n8 p548-549 Aug 75.

Descriptors: *Diagnosis(Medicine), Veterinary medicine, Lung, Lesions, Granuloma, Dolphins(Mammals), Fungus diseases, Pathology, Reprints.
Identifiers: Phycomycosis, Entomophthora coronata.

A photograph is provided of a nodule from the lung of a dolphin. It is diagnosed as phycomycosis.

PB-245 275/3GA MF$2.25
National Research Council, Washington, D.C. Committee on Animal Nutrition.
The Effect of Genetic Variance on Nutritional Requirements of Animals.
May 75, 131p* ISBN-0-309-02342-4
Contracts FDA-75-7001, USDA-12-14-0506-43
Paper copy available from National Academy of Sciences, 2101 Constitution Ave., Washington, D.C. 20418. Library of Congress Catalog Card no. 75-10567.

Descriptors: *Animal nutrition, *Genetics, *Domestic animals, *Nutrition, Cattle, Dairy cattle, Poultry, Sheep, Swine, Nutrients, Metabolism, Food consumption, Animal husbandry, Animal physiology.

The report provides a review of knowledge on the interactions of genetics and nutrition of animals. The species of animals discussed are: cattle for meat production, dairy cattle, poultry, sheep, and swine. Existing literature is reviewed. The report cites specific areas where additional research and information are needed.

2F. Forestry

E75-10419 PC$5.75/MF$2.25
Earth Satellite Corp., Berkeley, Calif.
Investigation to Develop a Multistage Forest Sampling Inventory System Using ERTS-1 Imagery.
Final rept. Sep 72-Feb 74,
Philip G. Langley, Jan Van Roessel, and S. L. Wert. Mar 75, 137p NASA-CR-14307
Contract NAS5-21853
Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls, S.D. 57198.

Descriptors: Forests, California, Earth resources program, Inventories, Sampling, Multispectral band scanners, Algorithms.

The author has identified the following significant results. The annotation system produced a RMSE of about 200 m ground distance in the MSS data system with the control data used. All the analytical MSS interpretation models tried were highly significant. However, the gains in forest sampling efficiency that can be achieved by using the models vary from zero to over 50% depending on the area to which they are applied and the sampling method used. Among the sampling methods tried, regression sampling yielded substantial and the most consistent gains. A single most significant variable in the interpretation model was the difference between bands 5 and 7. The contrast variable, computed by the Hadamard transform was significant but did not contribute much to the interpretation model. Forest areas containing very large timber volumes because of large tree sizes were not separable from areas of similar crown cover but containing smaller trees using ERTS image interpretation only. All correlations between space derived timber volume predictions and estimates obtained from aerial and ground sampling were relatively low but significant and stable. There was a much stronger relationship between variables derived from MSS and U2 data than between U2 and ground data.

TT-72-51125 PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Effect of Various Factors on the Production of Fir Oil (Vliyanie Razlichnykh Faktorov na Vyrabotku Pikhtovogo Masla),
N. G. Kosarev. 1975, 11p
Trans. of Lesnoe Khozyaistvo (USSR) v3 p63-65 1971. Sponsored in part by National Science Foundation, Washington, D.C. Foreign Currency Science Information Program.

Descriptors: *Fir trees, *Oils, *Plant growth, Age, Density(Mass/volume), Wood, Soil properties, Translations, USSR.

For planning the production of fir oil it is important to know the yield of slender fir branches from 1 cubic meter of felled wood. The results of investigations on the yield of slender fir branches in relation to the age and density of stands and also in relation to the diameter of trees are given.

3. ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

AD-A016 397/2GA PC$6.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
AFCRL Infrared Sky Survey. Volume I. Catalog of Observations at 4, 11, and 20 Microns.
Environmental research papers,
Russell G. Walker, and Stephen D. Price. 14 Jul 75, 156p Rept nos. AFCRL-TR-75-0373, AFCRL-ERP-522
ARPA Order-1366

Descriptors: *Intermediate infrared radiation, Infrared scanning, Celestial navigation, Stellar map matching, Emission spectra, Brightness, Spatial distribution, Coordinates, Position(Location), Stars, Sky, Surveys, Tables(Data), Statistical data.
Identifiers: *Infrared astronomy, *Infrared stars, Celestial guidance, *Stellar luminosity, Stellar spectra.

A survey of the sky in the intermediate infrared spectral region is reported. The objective was to obtain the brightness and spatial distribution of a representative sample of the types of celestial objects that emit strongly in the infrared. Of primary concern was the determination of the positions of unusual sources of emission with sufficient accuracy to enable them to be acquired by ground based telescopes for further detailed investigation.

AD-A016 490/5GA PC$6.25/MF$2.25
Boston Univ Mass Dept of Astronomy
Brightness Temperatures and Polarizations of Solar Active Regions at 3.8 CM - Theory and Observations.
Final rept. 1 sep 72-30 Jun 75,
Michael D. Papagiannis, and John A. Kogut. Sep 75, 158p Rept no. SER-II-No-59 AFCRL-TR-75-0430
Contract F19628-73-C-0058

Descriptors: *Solar activity, *Solar flares, Solar radiation, Extraterrestrial radio waves, Polarization, Brightness, Temperature, Ionosphere, Magnetosphere, Mathematical models.
Identifiers: *Solar radio emission, Brightness temperature, Circular polarization.

Extensive observations (230 hours in 1973 and 1974) of right and left circularly polarized emission from solar active regions were carried out at 3.8 cm with the 120 ft Haystack antenna, which at this frequency has a resolution of about 4.4 arc minutes. The purpose of these observations was to study the changes in brightness temperature and polarization before flare activity in the hope of recognizing characteristic patterns which could be used as warning signals in the forecasting of major solar flare events.

AD-A016 523/3GA PC$3.25/MF$2.25
Banaras Hindu Univ Varanasi (India) Inst of Tech

Role of Bremsstrahlung Cross-Section on the Generation of X-Ray Photons in the Lower Ionosphere,
R. R. Rausaria, R. P. Singhal, and R. N. Singh. 1 Jan 74, 8p AFCRL-TR-75-0491
Grant EOOAR-70-0070
Availability: Pub. in Indian Jnl. of Radio and Space Physics, v3 p373-379 Dec 74.

Descriptors: *Cosmic rays, *Bremsstrahlung, X rays, Ionosphere, Atmospheric physics, Cross sections, Electron irradiation, Approximation(Mathematics), Energy, Reprints.
Identifiers: Atmospheric bremsstrahlung, Coulomb correction, Born approximation.

Various formulae for bremsstrahlung cross-section have been reviewed and their suitability for the study of atmospheric bremsstrahlung has been discussed. Computations have been made using these formulae to study the angular dependence of bremsstrahlung cross-section for wide range of incident electron energy and emitted photon energy. It is shown that the bremsstrahlung cross-sections obtained by different methods differ from one another. Sample calculation of angular dependence of bremsstrahlung X-ray flux generated in the lower ionosphere has been made. The integrated X-ray flux is found to be larger than the result reported earlier. This value of the flux is likely to show better agreement with the measured bremsstrahlung flux. (Author)

AD-A016 524/1GA PC$3.25/MF$2.25
Banaras Hindu Univ Varanasi (India) Inst of Tech
Polarisation of Atmospheric Bremsstrahlung,
R. R. Rausaria, and R. N. Singh. 16 Aug 74, 3p AFCRL-TR-75-0490
Grant EOOAR-70-0070
Availability: Pub. in Nature, v253 p28-29 1975.

Descriptors: *Cosmic rays, *Bremsstrahlung, X rays, Polarization, High altitude, Energy, Electron irradiation, Atmospheric physics, Ionosphere, Reprints.
Identifiers: Atmospheric bremsstrahlung.

As energetic, charged particles penetrate into the atmosphere to about 90 km altitude, their direction and speed changes. These changes give rise to polarized bremsstrahlung X-rays. Using a procedure developed by Kirkpatrick and Wiedmann, the height profile of this polarization has been calculated. It was found that this polarization is very sensitive to changes in energy of incident electrons and the direction of emitted photons. It is suggested that simultaneous measurements of X-ray polarization at different heights allows the prediction of degradation of electron energy and flux. (Author)

AD-A016 528/2GA PC$3.25/MF$2.25
Aerospace Corp El Segundo Calif Space Physics Lab
The Relative Abundance of Neon and Magnesium in the Solar Corona.
Interim rept.,
Hugo R. Rugge, and Arthur B. C. Walker, Jr. 8 Oct 75, 21p Rept no. TR-0076(6960-01)-1
SAMSO-TR-75-237
Contract F04701-75-C-0076

Descriptors: *Solar corona, *Neon, *Magnesium, Solar atmosphere, Solar cosmic rays, Solar x rays, Abundance, Resonance absorption, Absorption spectra, Scientific satellites.
Identifiers: *Solar abundances, OV1-10 satellite.

A technique is proposed for determining the relative solar coronal abundance of neon and magnesium. The relative abundance is calculated directly from the relative intensity of the resonance lines of NeX (12.134 A) and Mg XI (9.169 A) without the need for the development of a detailed model of the thermal structure of the corona. Relatively low resolution Bragg crystal spectrometer results from the OV1-10 satellite are used to determine a coronal neon to magnesium relative abundance of 1.47 plus or minus 0.38.

AD-A016 586/2GA PC$3.25/MF$2.25
Stanford Univ Calif Inst for Plasma Research
Force Free Magnetic Fields and Solar Activity,
P. A. Sturrock, and C. W. Barnes. Aug 75, 17p Rept no. Scientific-2 AFCRL-TR-75-0474
Contract F19628-74-C-0054
See also report dated Aug 74, AD-A013 778.

Descriptors: *Solar flares, *Chromosphere, Magnetic fields, Solar structure, Solar corona, Forecasting.
Identifiers: *Solar magnetic fields.

This report, aimed at the prediction of solar flares, centers on devising methods for calculating magnetic field structures in the solar atmosphere. Force-free fields comprise an important class of magnetic-field structures which may be calculated by relaxation techniques. Models of force-free fields with cylindrical symmetry, based on a spherical boundary surface, were calculated. Evaluation of the energy of such structures provides information about the eruption of closed-field patterns to form open current sheets which can then lead to solar flares.

AD-A016 587/0GA PC$3.25/MF$2.25
Manila Observatory (Philippines)
Solar Radio Studies at Manila Observatory.
Final rept. 1 Jan 73-30 Jun 75,
V. L. Badillo, J. E. Salcedo, and E. R. Gallardo. 31 Jul 75, 8p AFCRL-TR-75-0443
Contract F19628-73-C-0035

Descriptors: *Solar flares, *Solar activity, Solar radiation, Extraterrestrial radio waves, Sunspots, Asymmetry, Philippines.
Identifiers: *Solar radio emission, Manila Observatory.

Distribution studies of flares, cm and dekameter radio bursts in the period 1970-72 show an eastern hemisphere preference by dekametric source sites.

AD-A016 588/8GA PC$3.75/MF$2.25
Stanford Univ Calif Radio Astronomy Inst
Study of the Three Centimeter Radio Frequency Emanation from the Solar Atmosphere,
C. John Grebenkemper. 18 Aug 75, 34p Rept no. Scientific-2 AFCRL-TR-75-0452
Contract F19628-74-C-0053
See also report dated 29 Aug 74, AD-A006 125.

Descriptors: *Extraterrestrial radio waves, Solar radio maps, Power spectra, Solar radiation, Intensity, Brightness, Temperature.
Identifiers: *Solar radio emission, *Quiet sun, Brightness temperature.

Observations of the quiet sun and two solar active regions are discussed. The quiet sun is found to consist of a number of radio sources with lifetimes greater than two hours. Power spectra of the time variation of these sources reveal no periodicity.

AD-A016 758/5GA PC$3.75/MF$2.25
Lockheed Missiles and Space Co Inc Palo Alto Calif Palo Alto Research Lab
A Comparison of Flares and Prominences in D3 and H(alpha).
Final rept. 1 Jul 74-30 Jun 75,
Harry E. Ramsey, Sara F. Martin, and Karen L. Harvey. 30 Jun 75, 31p AFCRL-TR-75-0355
Contract F19628-75-C-0052

Descriptors: *Solar flares, *Solar x rays, Surges, Filaments, Helium, Nuclear explosions, Hydrogen, H band, Deuterium, X ray spectra.
Identifiers: Iodine inorganic compounds, Prominences.

During 1973, flares were photographed using a 0.4A filter on the D3 line of HeI and, in 1974, with an additional passband at 0.8A into the red wing. During most of this period, time-lapse photographs also were taken on either or both the H(alpha) multi-slit spectrograph and the H(alpha) Doppler filter. On a separate telescope, limb events were photographed in D3 and H(alpha) through similar 8A filters. Very few flares displayed D3 in emission in part of the flare. For large flares, some absorption parts of the D3 flare correspond closely to the H(alpha) flare both spatially and temporally. However, the D3 flare boundaries are more sharply defined. It seemed D3 absorption events were correlated more frequently with surges and active filaments than with flare elements. The relative brightness of D3 and H(alpha) were examined for a number of solar phenomena observed at the limb. High velocity portions of surges, erupting filaments and loops brightened more in H(alpha) were examined for a number of solar phenomena observed at the limb. High velocity portions of surges, erupting filaments and loops brightened more in H(alpha) than in D3. In limb flares, D3 brightened more than H(alpha).

COM-75-11456/1GA PC$3.25/MF$2.25
National Environmental Satellite Service, Washington, D.C.
Operational Processing of Solar Proton Monitor Data.
Technical memo.,
Stanley R. Brown. Sep 75, 21p NOAA-TM-NESS-73 NOAA-73091908
Supersedes rept. no. NOAA-TM-NESS-49, COM-73-11647.

Descriptors: *Solar radiation, *Data processing, Proton counters, Computer systems hardware, Computer programming, Solar flares, Scientific satellites.
Identifiers: *Solar protons, ITOS satellites.

Operational processing of data obtained from the solar proton monitor sensor flown on environmental satellites of the new TIROS (television infrared observation satellite) series named ITOS (improved TIROS operational satellite) is described. Hardware systems aboard the ITOS are discussed and the software procedures relevant to the data recovery, recording, and transmission problems are described. Included are descriptions of tape formats, message formats, data location procedures, data frame contents, and a partial index of processed data available in archival form.

COM-75-11458/7GA PC$5.25/MF$2.25
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
A Decametric Wavelength Radio Telescope for Interplanetary Scintillation Observations.
Final project rept.,
Willard M. Cronyn, and Stanley D. Shawhan. Jul 75, 109p U. of Iowa-75-12-Rev NOAA-75092303
Contract NASA-S-57016-A, Grant NGL-16-001-002
Sponsored in part by National Science Foundation, Washington, D.C. Grant NSF-DES73-06559.

Descriptors: *Radio telescopes, *Solar wind, Ionosphere, Remote sensing, Electron density, Interplanetary medium, Site selection, Design, Photographs, Data acquisition, Antenna arrays, Scintillation, Ionospheric propagation, California.
Identifiers: *Interplanetary scintillations, Cocoa Cross Radio Telescope, Borrego Springs(California).

A phased array, electrically steerable radio telescope, with a total collecting area of 18 acres (one of the largest in the world) has been constructed for the purpose of remotely sensing electron density irregularity structure in the solar wind. The Cocoa Cross radio telescope will locate, map, and track large scale features of the solar wind, such as streams and blast waves, by monitoring a large grid of natural radio sources subject to rapid intensity fluctuation (interplanetary scintillation) caused by the irregularity structure. This report is an account of progress to date on construction and operation of the telescope, observations, and initial scientific results.

COM-75-50605/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Dynamical Tide in Close Binaries.
Final rept.,
J. P. Zahn. Jul 75, 16p
Pub. in Astronomy and Astrophysics, v41 n314 p329-344 Jul 75.

Descriptors: *Binary stars, Gravitational fields, Oscillations.
Identifiers: Reprints.

The non-adiabatic oscillations of a star, driven by an outer rotating gravitational field, have been studied by the use of matched asymptotic expansions. The interior and envelope solutions in this procedure are derived in sections 2 and 3. The results apply to stars which have a convective core and a radiative envelope, and they are discussed in section 4. The author finds that the resonances of the free gravity modes are damped by radiative dissipation, which operates in a relatively thin region below the surface of the star. Due to that dissipation, some properties of the dynamical tide have observable consequences in close binary systems: (1) A torque is applied to a binary component; this serves to make it corotate with its companion in a time which can be short compared to its nuclear life. (2) Before that synchronization is achieved, the brightness distribution over the surface of the star is in general phase shifted relative to the external driving potential.

COM-75-50609/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Flare Model Chromospheres and Photospheres.
Final rept.,
M. E. Machado, and J. L. Linsky. Jun 75, 26p
Grant NGR-06-003-057
Pub. in Solar Physics, v42 n2 p395-420 Jun 75.

Descriptors: *Chromosphere, *Photosphere, *Solar flares, Sunspots, Temperature.

Homogeneous plane-parallel model atmospheres for solar flares were constructed to approximately simulate observations of flares. The wings of the Ca II lines were used to derive flare upper photosphere models. Transfer and statistical equilibrium equations for a three-level hydrogen atom and a five-level calcium atom are solved.

COM-75-50821/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Reports of Observatories for 1973/74, National Bureau of Standards, Washington, D.C.
Interim rept. Sep 73-Sep 74,
Lucy Hagan. 1975, 5p
Pub. in Bull. Am. Astron. Soc., v7 n1 p165-169 1975.

Descriptors: *Molecular spectroscopy, *Atomic spectroscopy, Astronomy, Atomic spectra, Energy levels, Molecular spectra, Band spectra, Line spectra.
Identifiers: Reprints.

Research at the National Bureau of Standards in spectroscopy pertinent to astronomy is summarized. Publications on atomic spectra, atomic transition probabilities and line broadening, and molecular spectra are referenced and work in progress is discussed.

COM-75-50623/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Radio Search for HC3N, HCN, OH, and Detection of U8.19 in Comet Kohoutek (1973f).
Final rept.,
Paul T. Giguere, and Frank O. Clark. 15 Jun 75, 4p
Pub. in Astrophysical Jnl., v198 p761-764, 15 Jun 75.

Descriptors: *Radio sources(Astronomy), *Comets, Hydrogen cyanide, Hydroxides.
Identifiers: *Kohoutek comet, Hydroxyl radical, Propiolonitriles, Reprints.

Comet Kohoutek (1973f) was observed with the NRAO 140-foot (43 m) radio telescope in the period 1974 January 4-7 in an atempt to detect the following molecular transitions: HC3N, J = 1-0, v = 0; HC3N, J = 1-0,2v(7), l = 0; HCN, J = 6, 1v(2); and OH, doublet Pi(1/2), J = 5/2, F = 3-3. All results for these lines were negative. An unidentified line was possibly detected at 8189 MHz.

N75-31617/4GA PC$3.25/MF$2.25
Polytechnic Inst. of New York. Dept. of Meteorology and Oceanography.
Basic Research in Meteorology and Atmospheric Physics.
Final Report, 1 Jan. - 31 Jun. 1975.
J. E. Miller. Jul 75, 11p NASA-CR-143491
Grant NSG-5041, Contract PROJ. HIAM II

Descriptors: *Atmospheric physics, *Meteorology, *Research and development, Aerosols, Electromagnetic properties, Jupiter (Planet), Meteorological parameters, Oceanography, Planetary atmospheres, Stratosphere.

For abstract, see STAR 1322

N75-31755/2GA PC$5.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Exobiology of the Moon.
G. P. Vdovykin. Aug 75, 104p NASA-TT-F-16378
NASA ORDER W-13183
Tran-Transl. Into English from Izd-Vo Nauka (Moscow), 1975 119 p.

Descriptors: *Exobiology, *Moon, Lunar soil, Organic compounds.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31923/6GA PC$3.75/MF$2 25
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Angular Distributions of Electrons of Energy Esub E Greater Than 0.06 Mev in the Jovian Magnetosphere.
D. D. Sentman, and J. A. Vanallen. Jan 75, 47p
NASA-CR-143419, U-OF-IOWA-75-3
Contract NAS2-6553

Descriptors: *Angular distribution, *Jupiter (Planet), *Magnetospheric electron density, *Pioneer 10 space probe, Magnetopause, Radiation counters, Trapped particles.

For abstract, see STAR 1322

N75-31965/7GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Limit Cycle Analysis of Large Space Telescope with Cmg Nonlinearity.
S. M. Seltzer, B. C. Kuo, and G. Singh. Jun 75, 22p NASA-TM-X-64939, PAPER-74-874
Conf-Presented at the Aiaa and Control of Flight Conf., Anaheim, Calif., 5-9 Aug. 1974.

Descriptors: *Control moment gyroscopes, *Large space telescope, Friction, Functional analysis, Mathematical models, Nonlinearity, Self oscillation.

For abstract, see STAR 1322

N75-31966/5GA PC$3.25/MF$2.25
Lowell Observatory, Flagstaff, Ariz. Planetary Research Center.
Asteroid Observations and Planetary Atmospheres Analysis.
Semiannual Status Report, 1 Jan. - 30 Jun. 1975.
W. A. Baum, R. L. Millis, and E. L. G. Bowell. 12 Sep 75, 11p NASA-CR-143442, SASR-24
Contract NGR-03-003-001

Descriptors: *Asteroids, *Planetary atmospheres, Natural satellites, Photometers, Photomultiplier tubes.

For abstract, see STAR 1322

N75-31967/3GA PC$4.75/MF$2.25
Perkin-Elmer Corp., Norwalk, Conn. Electro-optical Div.
The 100 cm Solar Telescope Primary Mirror Study.
Mar 75, 76p NASA-CR-144673, REPT-12421
Contract NAS5-20776

Descriptors: *Astronomical telescopes, *Mirrors, *Solar instruments, Balloon flight, Performance prediction, Production engineering, Space shuttles.

For abstract, see STAR 1322

N75-31968/1GA PC$3.25/MF$2.25
Agnew Tech-Tran, Inc., Woodland Hills, Calif.
Zelenchukskaya Telescope.
Sep 75, 8p NASA-TT-F-16621
Contract NASW-2789
Tran-Transl. Into English from Informal Russian Report 8 p.

Descriptors: *Astronomical telescopes, *Radio telescopes, Cassegrain optics, Mounting, U.s.s.r..
Identifiers: Translations.

For abstract, see STAR 1322

N75-31969/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Scientific Operations Planning for the LST.
D. K. West. Sep 75, 18p NASA-TM-X-70975, X-604-75-239
Conf-Presented at AM. Astronautical Soc. 21ST Ann. Meeting Space Shuttle Missions, 26-28 Aug. 1975.

Descriptors: *Large space telescope, *Mission planning, *Operations research, *Project planning, Computer programs, Hardware, Images, Scientists, Telemetry.

For abstract, see STAR 1322

N75-31978/0GA PC$3.25/MF$2.25
Texas Univ., Austin. Applied Mechanics Research Lab.

Evaluation of Geopotential and Luni-Solar Perturbations by a Recursive Algorithm.
G. E. O. Giacaglia. Aug 75, 19p NASA-CR-143500, AMRL-1073
Contract NGR-44-012-269

Descriptors: *Geopotential, *Gravitational fields, *Recursive functions, *Solar activity, Euler-lagrange equation, Legendre functions, Numerical integration, Spherical harmonics.

For abstract, see STAR 1322

N75-31979/8GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Sensitivity Limits of an Infrared Heterodyne Spectrometer for Astrophysical Applications.
M. M. Abbas, M. J. Mumma, T. Kostiuk, and D. Buhl. Sep 75, 44p NASA-TM-X-70972, X-692-75-213
Subm-Submitted for Publication.

Descriptors: *Degradation, *Heterodyning, *Infrared spectrometers, *Sensitivity, Astronomical spectroscopy, Lasers, Line spectra.

For abstract, see STAR 1322

N75-31982/2GA PC$10.25/MF$2.25
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
On the Petrological, Geochemical, and Geophysical Characterization of a Returned MARS Surface Sample and the Impact of Biological Sterilization on the Analyses.
Apr 74, 387p NASA-TM-X-72501

Descriptors: *Chemical sterilization, *Geochemistry, *Mars surface, *Petrology, Chemical properties, Critical experiments, Geophysics, Random sampling.

For abstract, see STAR 1322

N75-31983/0GA PC$3.75/MF$2.25
California Inst. of Tech., Pasadena.
Apollo Program Soil Mechanics Experiment.
Final Report.
R. F. Scott. 1975, 30p NASA-CR-144438
Contract NAS9-11454

Descriptors: *Apollo project, *Lunar module, *Lunar surface, *Soil mechanics, Exhaust gases, Soil erosion, Spacecraft, Spacecraft propulsion, Surface properties.

For abstract, see STAR 1322

N75-31984/8GA PC$3.75/MF$2.25
Santa Clara Univ., Calif.
Studies in Matter Antimatter Separation and in the Origin of Lunar Magnetism.
Annual Progress Report, 1 Sep. 1974 - 31 Aug. 1975.
W. A. Barker, R. Greeley, C. Parkin, H. Aggarwal, and P. Schultz. 31 Aug 75, 33p NASA-CR-143428
Contract NGR-05-017-027

Descriptors: *Lunar composition, *Magnetic properties, *Planetary composition, Atmospheric models, Ionosphere, Lunar geology, Lunar rocks.

For abstract, see STAR 1322

N75-31985/5GA PC$3.75/MF$2.25
Catholic Univ. of America, Washington, D.C.
Magnetosphere of Mercury.
Semiannual Progress Report, Mar. - Aug. 1975.
Y. C. Whang. Aug 75, 26p NASA-CR-143429
Contract NGR-09-005-063

Descriptors: *Geomagnetism, *Magnetosphere, *Mercury (Planet), *Planetology, Bow waves, Magnetic dipoles, Magnetometers, Mariner space probes, Planetary magnetic fields.

For abstract, see STAR 1322

N75-31986/3GA PC$6.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge.
Precision Selenodesy Via Differential Very-Long-Baseline Interferometry.
Ph.D. Thesis.
R. W. King, Jr.. Jun 75, 173p NASA-CR-143452
Contract NAS5-11947, Grant NSG-7010

Descriptors: *Apollo lunar surface experiments package, *Differential interferometry, *Selenology, Error analysis, Lunar landing, Stadan (Satellite tracking network).

For abstract, see STAR 1322

N75-31987/1GA PC$13.00/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A Primer in Lunar Geology.
R. Greeley, and P. Shultz. 1974, 551p NASA-TM-X-72499
Grant NSG-07013
Subm-Prepared in Cooperation with Santa Clara Univ., Calif.

Descriptors: *Lunar geology, *Moon, *Textbooks, Education, Instructors.

For abstract, see STAR 1322

N75-31988/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A Short Course in Lunar Geology for Earth Science Instructors.
Final Report, 1 Jan. 1974 - Feb. 1975.
R. Greeley, and P. Shultz. Feb 75, 11p NASA-TM-X-72498
Grant NSG-07013
Subm-Prepared in Cooperation with Santa Clara Univ., Calif.

Descriptors: *Earth (Planet), *Instructors, *Lectures, *Lunar geology, *Moon, Visual aids.

For abstract, see STAR 1322

N75-31989/7GA PC$3.25/MF$2.25
Agnew Tech-Tran, Inc., Woodland Hills, Calif.
From the past of Meteorites.
B. Levin, and A. N. Simonenko. Sep 75, 21p NASA-TT-F-16537
Contract NASW-2789
Tran-Transl. Into English from Priroda (Moscow), No. 7, Jul. 1975 p 38-45.

Descriptors: *Meteorites, *Meteoritic composition, *Origins, Asteroids, Breccia, Cosmology, Meteor trails.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31990/5GA PC$3.25/MF$2.25
Lamont-Doherty Geological Observatory, Palisades, N.Y.
Study of Thermal Properties of the Lunar Regolith Based on in Situ Temperature Measurements and Experiments on Soil Simulants.
Final Technical Report, 1 Feb. 1972 - 1 Aug. 1973.
M. G. Langseth, and K. I. Horai. 1 Aug 73, 21p NASA-CR-143621
Contract NGR-33-008-174

Descriptors: *Lunar rocks, *Soil mechanics, *Temperature measurement, *Thermal conductivity, Equipment specifications, Numerical analysis, Radiant heating, Temperature measuring instruments.

For abstract, see STAR 1322

N75-31992/1GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Pioneer 11'S Encounter with Jupiter and Mission to Saturn.
J. W. Dyer. Sep 75, 22p NASA-TM-X-62480, A-6257
Conf-Presented at the Intern. Astronautical Federation 26TH Congr., Lisbon, 21-27 Sep. 1975.

Descriptors: *Jupiter (Planet), *Pioneer space probes, *Saturn (Planet), *Space exploration, Flyby missions, Lunar exploration, Mission planning.

For abstract, see STAR 1322

N75-31993/9GA PC$3.25/MF$2.25
Osservatorio Astronomico, Rome (Italy).
Solar Phenomena.
Monthly Bulletin, Jun. 1974.
M. Cimino. Jun 74, 9p PUBL-194

Descriptors: *Astronomical observatories, *Sunspots, H alpha line, Italy, K lines, Periodic variations, Solar magnetic field, Solar spectra, Tables (Data).

For abstract, see STAR 1322

N75-31994/7GA PC$3.25/MF$2.25
Osservatorio Astronomico, Rome (Italy).
Solar Phenomena.
Monthly Bulletin, Jul. 1974.
M. Cimino. Jul 74, 13p PUBL-195

Descriptors: *Astronomical observatories, *Sunspots, Italy, Periodic variations, Solar magnetic field, Solar spectra, Tables (Data).

For abstract, see STAR 1322

N75-31995/4GA PC$3.25/MF$2.25
Osservatorio Astronomico, Rome (Italy).
Solar Phenomena.
Monthly Bulletin, Aug. 1974.
M. Cimino. Aug 74, 12p PUBL-196

Descriptors: *Astronomical observatories, *Sunspots, H alpha line, Italy, K lines, Periodic variations, Solar magnetic field, Solar spectra, Tables (Data).

For abstract, see STAR 1322

N75-31996/2GA PC$5.24/MF$2.25
Bonn Univ. (West Germany). Inst. fuer Astrophysik.
Results of the Lyman alpha Measurements of the Satellite Dial Ergebnisse der Lyman-alpha Messungen des Satelliten Dial.
Final Report.
H. D. Schlichter. Jan 75, 104p BMFT-FB-W-75-01
Contract WRK-219/253
Subm-Prepared Jointly with Dfvlr, Oberpfaffenhoffen.
In German; English Summary.

Descriptors: *Dial satellite, *Geocoronal emissions, *Ionization chambers, *Lyman alpha radiation, *Solar activity, Exosphere, Nitric oxide, Ogo-4, Ogo-5, Photolysis, Photometers, Thermosphere.

For abstract, see STAR 1322

N75-31998/8GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Measurement of the Primary Cosmic Electron Spectrum from 10 to About 250-Gev.
R. F. Silverberg. Aug 75, 41p NASA-TM-X-70973, X-661-75-218
Subm-Submitted for Publication.

Descriptors: *Energy spectra, *Primary cosmic rays, *Spectrum analysis, Balloon-borne instruments, Electrons, Protons.

For abstract, see STAR 1322

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A016 365/9GA PC$3.75/MF$2.25
National Committee for Space Research Haifa (Israel) Radio Observatory
Ionospheric Research Using Satellites.
Final rept. 1 Feb 72-1 Feb 75,
Zvi Houminer, Israel Keroub, Jonathan Mass, and Avram Shuval. Jun 75, 38p AFCRL-TR-75-0449
Contract F44620-72-C-0059

Descriptors: *Ionosphere, *Ionospheric propagation, Radio signals, Faraday effect, Electron density, Polarization, Ray tracing, Navigation satellites, Israel.

This report describes work done in continuation of research on the ionosphere's influence on satellite radio signals. Calculating the influence of the TEC (Total Electron Content) on the errors in the NNSS Satellite Navigation System, results are given in graphical form for different passess and TEC's. The theory for evaluating Faraday rotations without postulating quasi-longitudinal conditions is given. Several new methods to determine the TEC accurately from records including transverse propagation conditions are proposed.

AD-A016 398/0GA PC$3.75/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Pc1 and Pc5 Micropulsation Polarization Patterns.
Environmental research papers,
John F. McClay . 29 May 75, 29p Rept nos. AFCRL-TR-75-0307, AFCRL-ERP-534

Descriptors: *Geomagnetism, Magnetosphere, Magnetic storms, Polarization, Eigenvectors, Magnetic fields, Electric Fields, Mathematical models, Diurnal Variations.
Identifiers: *Geomagnetic micropulsations.

The position taken in this report is that the observable features of any pulsation or pulsation event are explained in terms of the physical properties of the eigenmodes of the system for a particular quasi-stationary state or a slowly varying sequence of quasi-stationary states. Discussed are: Field configuration of the eigenmodes for the resonance model; physical properties of polarization and magnetic energy density; latitudinal and diurnal variations in Pc4-5 H-D polarization patterns (including the demarcation latitude); and the simultaneous occurrence of left-and right-handed polarization in a Pc1 event.

AD-A016 530/8GA PC$3.75/MF$2.25
Aerospace Corp El Segundo Calif Space Physics Lab
Measurement of Energetic Particle Radiation at the Synchronous Altitude Aboard ATS-6.
Interim rept.,
George A. Paulikas, J. Bernard Blake, and Sam S. Imamoto. 30 Sep 75, 32p Rept no. TR-0076(6260-20)-7 SAMSO-TR-75-227
Contract F04701-75-C-0076
Sponsored in part by National Aeronautics and Space Administration, Washington, D.C. Contract NASw-2762.

Descriptors: *Magnetosphere, *Cosmic rays, *Alpha particles, Scientific satellites, Radiation measuring instruments, Synchronous satellites.
Identifiers: ATS-6 satellite, Plasmapause.

The Aerospace Corporation energetic electron-proton spectrometer operating on ATS-6 is described. This experiment detects energetic electrons in four channels between 140 keV and greater than 3.9 MeV, measures energetic protons in five energy channels between 2.3 and 80 MeV and energetic alpha particles in three channels between 9.4 and 94 MeV. After more than a year of operation in orbit, the experiment continues to return excellent data on the behavior of energetic magnetospheric electrons as well as information regarding the fluxes of solar protons and alpha particles.

AD-A016 538/1GA PC$3.25/MF$2.25
Banaras Hindu Univ Varanasi (India) Inst of Tech
Acceleration of Charged Particles in Magnetospheric Neutral Plasma Sheet,
P. N. Khosa, R. R. Rausaria, and R. N. Singh. 2 Feb 74, 10p AFCRL-TR-75-0489
Grant EOOAR-70-0070
Availability: Pub. in Indian Jnl. of Radio and Space Physics, v3 p407-415 Dec 74.

Descriptors: *Magnetosphere, *Plasma medium, *Charged particles, Acceleration, Conductivity, Instability, Solar wind, Geomagnetism, Magnetic storms, Interactions, Geophysics, Reprints.
Identifiers: Neutral plasma sheet, Plasma conductivity, Plasma instability.

The reconnection of magnetic field lines in the neutral plasma sheet has been studied in the light of momentum conservation and charge neutrality. The effect of field variations and plasma conductivity on the charged particle dynamics has been studied. It is found that the charged particles emerging out of the neutral plasma sheet are energized. It is argued that the reconnection process would make the plasma sheet unstable. The onset of likely instabilities in the neutral plasma sheet and their geophysical implication has been briefly outlined. (Author)

AD-A016 565/4GA PC$5.25/MF$2.25
Boston Coll Chestnut Hill Mass
Cylindrical Langmuir Probe Measurements from Rocket Flights Covering the Period 31 January 1969 through 3 Apr 1974,
Robert C. Wilson. 30 Apr 75, 122p Rept no. Scientific-1/2 AFCRL-TR-75-0265
Contract F19628-72-C-0089

Descriptors: *Ionosphere, *Langmuir probes, Atmospheric sounding, Rocketborne, Electron beams, Ion beams, Graphs, D region.
Identifiers: E region.

The current measurements made by cylindrical Langmuir probe systems flown on NIRO and Ute-Tomahawk vehicles are described. Particular emphasis is placed on the electron current and positive ion current. Measurements were made over an altitude range extending from 60 kilometers to 145 kilometers, thus, encompassing the D- and E- regions. The development of the electronic instrumentation is presented.

AD-A016 569/6GA PC$3.75/MF$2.25
Emmanuel Coll Boston Mass
Proton Flux Data Obtained on Air Force Satellite 72-1 over the Period October 1972 - February 1973
Ernest Holeman, and Robert Filz. Jun 75, 42p
Rept no. Scientific-2 AFCRL-TR-75-0377
Contract F19628-73-C-0190
See also report dated Jun 74, AD-786 477.

Descriptors: *Magnetosphere, *Protons, Flux density, Trapping(Charged particles), Tables(Data), Scientific satellites.
Identifiers: S72-1 Satellite.

This report provides a table of trapped proton directional and omnidirectional fluxes. The fluxes are obtained by summing all available data over the period October 1972 to February 1973. No corrections are made for instrumental effects or time variations.

AD-A016 584/5GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
Transport Techniques for Describing Scattering and Energy Deposition of Energetic Auroral Electrons.
Interim rept.,
D. J. Strickland, D. L. Book, T. P. Coffey, and J. A. Fedder. Sep 75, 44p Rept no. NRL-MR-3117

Descriptors: *Aurorae, *Electron scattering, Fokker Planck equations, Boltzmann equation, Partial differential equations, Numerical integration.

Auroral electron scattering and energy loss are calculated using for the first time a multi-angle equation of transfer at all energies. The results are compared with those obtained using a Fokker-Planck equation. Both equations have been solved in terms of their eigensolutions. The equation of transfer has also been solved by numerical integration. Fokker-Planck solutions agree well with equation-of-transfer solutions above 3 keV but deviate increasingly at lower energies. A comparison is made between the present Fokker-Planck results and those of M. Walt at 10 keV, giving good agreement. Energy deposition rates are also found to agree satisfactorily with those obtained previously. The accuracy of integration of the transfer equation is tested by comparing results obtained by the eigenvalue method and the direct integration method. Differences of less than 5% were found at all altitudes, energies and pitch angles. The predicted backscatter near the upper energy boundary' is sensitive to the boundary condition there. Backscatter results for various boundary conditions in energy show both this and the effects of the propagation of the boundary condition toward lower energies. Solutions to the equation of transfer are presented over the energy range from 10 ev to 40 keV and demonstrate the rapid rise in the flux below 100 ev, which is known to occur because of secondary electron production.

AD-A016 585/2GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
Linear Models of Mesospheric Circulation.
Interim rept.,
Louis Baker, and Darrell Strobel. Aug 75, 33p
Rept no. NRL-MR-3101

Descriptors: *Mesosphere, *Atmospheric circulation, *Atmosphere models, Wind velocity, Mathematical models, Mesopause, Temperature, Energetic properties.

Leovy's (1964) linear separable models are generalized to include viscosity and Rayleigh friction simultaneously and to allow the variation of static stability, heat input, and thermal relaxation arbitrarily with height. The most important parameter in the model is the Newtonian cooling rate (thermal relaxation rate). For the values given by Dickinson (1973) realistic models that describe the observed temperature and zonal wind fields are obtained. The approx-

imations of quasi-geostrophy and linearization are valid for the momentum balance of the flow. However, near the poles and above the height of maximum forcing, vertical and horizontal heat advection is important in the energy balance.

AD-A016 591/0GA PC$3.75/MF$2.25
Wyoming Univ Laramie Dept of Physics and Astronomy
Stratospheric Aerosol Measurements III: Optical Model Calculations.
Annual rept.,
J. M. Rosen, and D. J. Hofmann. Dec 74, 46p
Rept no. GM-25
Contract N00014-70-A-0266-0005

Descriptors: *Stratosphere, *Aerosols, *Atmosphere models, Particle size, Meteorological balloons, Light scattering, Mie scattering, Albedo, Optical radar, Atmospheric sounding.
Identifiers: DOT/5N.

Articles in the literature dealing with light scattering properties of atmospheric aerosols are numerous and of great variety. Many fall into two general categories: those in which the effect of aerosols on radiative transfer processes in the atmosphere is studied, and those in which aerosol size distribution or composition information is obtained (or shown possible to be obtained) from light scattering measurements in the atmosphere. The results reported here, although limited to the stratospheric aerosol layer, are believed to be based on the most consistent and globally extensive measurements of the aerosol size distribution made to date. From this comprehensive set of data and other data on aerosol composition, the authors have constructed appropriate optical models which are used in Mie single-scattering calculations of the aerosol total extinction, absorption, 180 degree lidar backscattering, angular scattering, outward (2 pie hemispheric) scattering for a given solar zenith angle and finally, values of the global stratospheric aerosol albedo.

AD-A016 673/6GA PC$3.75/MF$2.25
Lockheed Missiles and Space Co Inc Palo Alto Calif
Ionospheric Effects Induced by Precipitating Auroral Electrons. HAES Report No. 14.
Final rept. 1 Feb 74-1 Feb 75,
J. B. Cladis, G. T. Davidson, W. E. Francis, L. L. Newkirk, and M. Walt. 22 Jul 75, 46p DNA-3648F
Contract DNA01-74-C-0146
Report on High Altitude Effects Simulation Program. See also report dated Jan 74, AD-779 892.

Descriptors: *Ionosphere, *Polar regions, Aurorae, Energy, Deposition, Electrons, Heating, Electron flux, Electron density, Nuclear explosions, High altitude, Ionospheric disturbances.
Identifiers: Ice cap operation, AURORA computer code.

The results of a coordinated experiment conducted in the auroral zone on 8 December 1971 were used to determine whether the AURORA computer code includes all of the important processes associated with the precipitation of electrons in the atmosphere. A precipitating electron flux was measured with the 1971-089A satellite simultaneously with ionospheric electron number-density distribution measurements using the Chatanika incoherent-scatter radar. The electron density distribution was compared with the distribution computed by the AURORA code, using the measured electron flux as input. The AURORA code was used to compute energy-deposition profiles in the atmosphere due to the precipitation of electrons released by high-altitude nuclear detonations.

AD-A016 675/1GA PC$5.25/MF$2.25
Stanford Research Inst Menlo Park Calif
Effective Recombination Coefficient of the Polar D-Region Under Conditions of Intense Ionizing Radiation.
Topical rept. Nov 73-Oct 74,
Theodore M. Watt. 15 Jul 75, 102p DNA-3663T
Contract DNA001-74-C-0167

Descriptors: *Gas ionization, *Ionospheric disturbances, *Polar cap absorption, Beta particles, Nuclear explosions, Radiation dosage, Electron density, Airburst, High altitude, D region, Solar flares, Radar interference, Magnetic storms, Recombination reactions.
Identifiers: *Solar particle events, Sudden ionospheric disturbances.

The intense solar-particle event in August 1972 produced high levels of ionization at altitudes of 60 to 90 km over the DNA/SRI Incoherent Scatter radar located at Chatanika, Alaska. The magnitude of the instantaneous ionizing fluxes at times approached those expected from the beta flux densities following some high-altitude nuclear detonations of interest in system problems. The cumulative radiation doses, leading to build-up of unusual molecules, were probably comparable to those expected from some high-altitude nuclear detonations. These ionizing fluxes were measured by the Lockheed 1971-089 polar-orbiting satellite.

AD-A016 733/8GA PC$3.25/MF$2.25
Rice Univ Houston Tex Dept of Space Physics and Astronomy
Horizontal Lightning.
Technical rept.,
Thomas L. Teer, and A. A. Few. 23 Jan 74, 9p
Rept no. TR071-752
Contract N00014-75-C-0139
Continuation of Contract N00014-67-A-0145-0004.
Availability: Pub. in Jnl. of Geophysical Research, v79 n24 p3436-3441, 20 Aug 74.

Descriptors: *Lightning, *Cumulonimbus clouds, Paths, Horizontal orientation, Electric discharges, Acoustic data, Alignment, Spatial distribution, Cloud physics, Freezing, Thunderstorms, Dissipation, Atmosphere models, Reprints.
Identifiers: Data reconstruction.

A study of the totality of lightning activity during the final 30 minutes of a thunderstorm for which the lightning channels and the charge source regions have been reconstructed using acoustic techniques reveals that most lightning channels are predominately horizontal inside the clouds. A thin layer (approximately 1 km thick) near the freezing level (approximately-10C) supplies most of the lightning. In addition to being horizontal in this layer the channels tend to be mutually aligned. (Author)

AD-A016 755/1GA PC$3.75/MF$2.25
Utah State Univ Logan Electro-Dynamics Lab
Near-Infrared Auroral Spectra,
Doran Baker, Allan Steed, Ronald Huppi, and William Pendleton, Jr. 31 Dec 74, 38p Rept no. Scientific-1 AFCRL-TR-75-0010
Contract F19628-73-C-0048

Descriptors: *Infrared spectra, *Aurorae, Nitrogen, Oxygen, Emission spectra, Near infrared radiation, Airglow.
Identifiers: Nightglow.

The near-infrared spectrum of an aurora in comparison with the high-latitude night airglow has been obtained using a wide-field interferometer-spectrometer. The spectral coverage is from about 0.9 to 1.6 micrometers at a resolving power of 1600. The principal auroral features which were observed during a Class III auroral breakup the night of April 19, 1974, at Poker Flat, Alaska, are the N2(+) Meinel bands, the N2 First Positive bands, and certain atomic O and N emission lines. Comparisons are made with laboratory spectra.

AD-A016 765/0GA PC$4.25/MF$2.25
Environmental Research and Technology Inc Concord Mass
The Estimation of Clear Sky Emission Values from Cloudy Radiometric Data.
Final rept. Sep 74-Jun 75,
Mary Grace Fowler, Nien Dak Sze, Norman E. Gaut, and David T. Chang. Aug 75, 58p Rept no. ERT-P-1234F AFCRL-TR-75-0440
Contract F19628-75-C-0035

Descriptors: *Radiometry, *Atmospheric scattering, Cloud cover, Microwaves, Atmospheric sounding, Brightness, Temperature, Side looking radar, Arctic regions, Tropical regions.
Identifiers: *Brightness temperature, Remote sensing.

This report determines the effects of clouds on sidelooking microwave radiometers and develops a technique to adjust cloudy emission values to equivalent clear emission measurements. Clouds of varying liquid water contents and altitudes were used with atmospheres representative of the arctic, mid-latitudes, and tropics. Their effects on microwave brightness temperatures were examined for frequencies between 15 and 55 GHz on a ground-based radiometer viewing at zenith angles from 0 degrees to 89 degrees. The strongest cloud effects were found for low elevation angles at frequencies away from the water vapor and oxygen lines. A technique is proposed which uses cloudy emission measurements made by a scanning two-channel radiometer, and a statistical inversion procedure, to infer equivalent clear emission values.

AD-A016 767/6GA PC$3.75/MF$2.25
Gca Corp Bedford Mass Gca Technology Div
Laser Backscatter Experiment.
Final rept. 1 Sep 74-30 Jun 75,
Andrew Tomlinson. Aug 75, 39p Rept no. GCA-TR-75-3-A AFCRL-TR-75-0444
See also AD-A000 508.

Descriptors: *Thermosphere, *Laser beams, *Atmospheric density, Light scattering, Measurement, Dye lasers, Instrumentation, Circuits, Backscattering.
Identifiers: Atmospheric attenuation, Atmospheric transmissivity.

A previously fabricated payload designed to measure total atmospheric density by Rayleigh Backscatter of a Dye Laser in the thermosphere over the altitude range of 90 km to 160 km was launched from White Sands Missile Range on June 10, 1975. No data regarding density was received, however successful operation of the laser throughout the altitude range of interest was recorded. Lack of data has bee » determined to be due to improper synchronization of laser output with receiver gate time.

AD-A016 839/3GA PC$3.25/MF$2.25
Rice Univ Houston Tex Dept of Space Physics and Astronomy
Lightning Sources in Severe Thunderstorms.
Technical rept.,
A. A. Few. 22 Sep 75, 8p Rept no. TR071-754
Contracts N00014-75-C-0139, N00014-67-A-0145-0004
Pub. in Conference on Cloud Physics, 1974, American Meteorological Society.

Descriptors: *Lightning, *Thunderstorms, *Acoustic detection, Locus, Sources, Structural properties, Distribution, Ray tracing.

Acoustic techniques are employed to determine the location of all of the lightning activity during the life cycle of a severe thunderstorm. These results have been compared in time and space to radar echo contours, and it has been found that (1) the lightning activity is layered near -10 degrees C, (2) the active region and many channels are predominantly horizontal, (3) the

horizontal channels exhibit alignment, (4) lightning activity is concentrated in regions of low radar reflectivity, and (5) radar reflectivity enhancement occurs locally following lightning activity.

AD-A017 001/9GA PC$3.25/MF$2.25
Iowa Univ Iowa City Dept of Physics and Astronomy
Examples of Plasma Flows within the Earth's Magnetosphere.
Research rept.,
L. A. Frank, and K. L. Ackerson. Sep 75, 25p
Rept no. U. of Iowa-75-36
Contract N00014-68-A-0196-0009, Grant NAS5-11039

Descriptors: *Magnetosphere, *Plasmas(Physics), Magnetic storms, Scientific satellites, Periodic variations.
Identifiers: IMP 6 satellite, IMP 7 satellite, Magnetopause.

Examples of observed flows of plasmas in the dayside magnetosphere near the magnetopause, within the ring current in the local-evening sector, and at two positions simultaneously in the plasma sheet are presented. These measurements were gained with LEPEDEA plasma instruments on the satellites IMP's -6 and -7. Flow velocities inside the magnetopause in the dayside magnetosphere are typically 25 to 75 km/sec, and are directed generally parallel to the tangent to the nearby magnetopause with a small component directed into this boundary. Bulk flow speeds within the ring current ranged from the instrument threshold of about 20 km/sec to speeds of 50 km/sec. Strong tailward 'jetting' of plasmas, in the range of 200 to 300 km/sec, at geocentric radial distances about 35 (R sub E) in the plasma sheet is found to be often associated with the occurrence of magnetic substorms.

COM-75-11413/2GA PC$4.25/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.
A Semi-Automated System for True-Height Analysis of Film Ionograms. Part 1. Overall Description.
Technical memo.,
G. M. Lerfald, J. Wohlmut, R. B. Jurgens, and G. Goe. Oct 73, 51p NOAA-TM-ERL-SEL-27 NOAA-75091703
Prepared in cooperation with Metrics Corp., Sunnyvale, Calif. See also part 2 dated Oct 74, COM-75-10217.

Descriptors: *Ionograms, *Ionosphere, Electron density(Concentration), Incoherent scattering, Height finding, Data processing.

An analysis system which automates many of the steps required to obtain electron density versus true height profiles from film ionogram data is described. The approach used retains the judgment and pattern recognition capabilities of trained operators to select and identify the ionogram traces of interest, but relies on automatic data processing techniques to perform essentially all other functions.

N75-31616/8GA PC$3.25/MF$2.25
Physical Research Lab., Ahmedabad (India).
An Experimental System for Laboratory Simulation of Equatorial Electrojet Instabilities.
P. I. John, and Y. C. Saxena. 1975, 16p PLA-75-04

Descriptors: *Equatorial electrojet, *Magnetohydrodynamic stability, *Simulation, Digital techniques, Signal analysis, Statistical analysis.

For abstract, see STAR 1322

N75-31618/2GA PC$4.75/MF$2.25
Alabama Univ., Huntsville. School of Graduate Studies and Research.
Multifluids Description of Dynamics of Upper Atmosphere.
Final Technical Report.
S. T. Wu, and R. J. Hung. Jul 75, 89p NASA-CR-143930, UAH-RR-175
Contract NAS8-29543

Descriptors: *Atmospheric models, *Fluid dynamics, *Ionosphere, *Upper atmosphere, Ionospheric propagation, Magnetohydrodynamic stability, Pressure gradients, Time dependence, Wind (Meteorology).

For abstract, see STAR 1322

N75-31619/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
An Automated Atmospheric Sampling System Operating on 747 Airliners.
P. Perkins, and U. R. C. Gustafsson. 1975, 15p NASA-TM-X-71790, E-8455
Conf-Presented at Intern. Conf. On Environ. Sensing and Assessment, 14-19 Sep., 1975; Sponsored by IEEE.

Descriptors: *Air sampling, *Automatic test equipment, *Global air sampling program, Carbon monoxide, Ozone, Particles, Stratosphere, Troposphere, Water vapor.

For abstract, see STAR 1322

N75-31621/6GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Vertical Temperature and Density Patterns in the Arctic Mesosphere Analyzed as Gravity Waves.
I. J. Eberstein, and J. S. Theon. Mar 75, 47p NASA-TM-X-70962, X-911-75-69
Subm-Submitted for Publication.

Descriptors: *Arctic regions, *Density distribution, *Gravity waves, *Mesosphere, *Temperature distribution, Atmospheric models, Rocket sounding, Sound waves, Thermodynamics.

For abstract, see STAR 1322

N75-31623/2GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Janvier 1974.
Monthly Bulletin, Jan. 1974.
Jan 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1322

N75-31624/0GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Fevrier 1974.
Monthly Bulletin, Feb. 1974.
Feb 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1322

N75-31625/7GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Ionospheric and Cosmic Ray Observations Observations Ionospheriques et du Rayonnement Cosmique Bulletin Mensuel, MARS 1974.
Monthly Bulletin, Mar. 1974.
Mar 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Cosmic rays, *Ionospheric sounding, *Neutron flux density, *Tables (Data), E region, F region, Maximum usable frequency.

For abstract, see STAR 1322

N75-31626/5GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Ionospheric and Cosmic Ray Observations Observations Ionospheriques et du Rayonnement Cosmique Bulletin Mensuel, Avril 1974.
Monthly Bulletin, Apr. 1974.
Apr 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Cosmic rays, *Ionospheric sounding, *Neutron flux density, *Tables (Data), E region, F region, Maximum usable frequency.

For abstract, see STAR 1322

N75-31627/3GA Not available NTIS
Institut Royal Meteorologique de Belgique, Brussels.
Ionospheric and Cosmic Ray Observations Observations Ionospheriques et du Rayonnement Cosmique Bulletin Mensuel, Mai 1974.
Monthly Bulletin, May 1974.
May 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Cosmic rays, *Ionospheric sounding, *Neutron flux density, *Tables (Data), E region, F region, Maximum usable frequency.

For abstract, see STAR 1322

N75-31628/1GA PC$4.25/MF$2.25
Kiruna Geophysical Observatory (Sweden).
Kiruna Geophysical Data.
Data Summary, Apr. - Jun. 1974.
G. Gustafsson. Jun 74, 64p REPT-74/4-6

Descriptors: *Electromagnetic absorption, *Geomagnetism, *Geophysical observatories, *Polar regions, *Riometers, Auroras, Cosmic noise, Diurnal variations, Ionospheric propagation, Magnetic signatures, Sweden, Tables (Data).

For abstract, see STAR 1322

N75-31629/9GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Ionospheric and Cosmic Ray Observations Observations Ionospheriques et du Rayonnement Cosmique Bulletin Mensuel, Juin 1974.
Monthly Bulletin, Jun. 1974.
Jun 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Cosmic rays, *Ionospheric sounding, *Neutron flux density, *Tables (Data), E region, F region, Maximum usable frequency.

For abstract, see STAR 1322

N75-31630/7GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, MARS 1974.
Monthly Bulletin, Mar. 1974.
Mar 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1322

N75-31631/5GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Avril 1974.
Monthly Bulletin, Apr. 1974.
Apr 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1322

N75-31632/3GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Mai 1974.
Monthly Bulletin, May 1974.
May 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, Geophysical observatories, Tables (Data).

For abstract, see STAR 1322

N75-31633/1GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Ionospheric and Cosmic Ray Observations Observations Ionospheriques et du Rayonnement Cosmique Bulletin Mensuel, Octobre 1974.
Monthly Bulletin, Oct. 1974.
Oct 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Cosmic rays, *Ionospheric sounding, *Neutron flux density, *Tables (Data), E region, F region, Maximum usable frequency.

For abstract, see STAR 1322

N75-31634/9GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Ionospheric and Cosmic Ray Observations Observations Ionospheriques et du Rayonnement Cosmique Bulletin Mensuel, Novembre 1974.
Monthly Bulletin, Nov. 1974.
Nov 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Cosmic rays, *Ionospheric sounding, *Neutron flux density, *Tables (Data), E region, F region, Maximum usable frequency.

For abstract, see STAR 1322

N75-31635/8GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Septembre 1974.
Monthly Bulletin, Sep. 1974.
Sep 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1322

N75-31636/4GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Octobre 1974.
Monthly Bulletin, Oct. 1974.
Oct 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1322

N75-31637/2GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Novembre 1974.
Monthly Bulletin, Nov. 1974.
Nov 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1322

N75-31638/0GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Ozone Observations Observations d'Ozone 3EME Trimestre 1971.
Quarterly Report, 1971.
1974, 38p QR-3
In French and Dutch.

Descriptors: *Atmospheric composition, *Belgium, *Gas density, *Ozone, Partial pressure, Spectrophotometry, Tables (Data), Temperature distribution.

For abstract, see STAR 1322

N75-31662/0GA PC$4.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Development of a Stratospheric and Mesospheric Microwave Temperature Sounder Experiment.
Final Report, 25 Jun. 1971 - 30 Jun. 1975.
D. H. Staelin, P. W. Rosenkranz, B. G. Anderson, K. F. Kunzi, and R. M. Paroskie. 30 Jun 75, 70p
NASA-CR-132719
Contract NAS1-10693

Descriptors: *Atmospheric temperature, *Microwave spectra, *Spectrometers, Experimental design, Microwave radiometers, Oxygen spectra, Pressure broadening, Temperature profiles.

For abstract, see STAR 1322

N75-31676/0GA PC$4.25/MF$2.25
World Meteorological Organization, Geneva (Switzerland).
Climatological Aspects of the Composition and Pollution of the Atmosphere.
G. C. Holzworth. 1974, 54p WMO-393, TN-139

Descriptors: *Air pollution, *Climatology, *Environmental quality, *Northern hemisphere, *Pollution monitoring, Atmospheric composition, Fog, Mixing length flow theory, Photochemical reactions, Precipitation (Meteorology), Wind direction, Wind velocity.

For abstract, see STAR 1322

PB-245 701/8GA Not available NTIS
National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
Insolation and Net Long-Wave Radiation off the Oregon Coast,
R. K. Reed, and D. Halpern. 20 Feb 75, 7p
NSF/IDOE-75-28
Grant NSF-AG-299
Sponsored in part by Office of Naval Research, Arlington, Va.
Pub. in Jnl. of Geophysical Research, v80 n6 p839-844, 20 Feb 75.

Descriptors: *Insolation, *Solar radiation, Heat transmission, Ocean surface, Pyranometers, Coasts, Oregon, Cloud cover, North Pacific Ocean.
Identifiers: International decade of ocean exploration, Radiative transfer, Atmospheric transmissivity, Reprints.

Insolation, net radiation, and various oceanic and atmospheric variables were measured about 120 km off the coast of Oregon in July and August 1973. The daily mean net solar radiation ranged from 0.10 to 0.40 cal/sq cm/min, and large spatial variations of radiation in this upwelling region were present. The daily mean values were not closely related to the proportion of sky covered with clouds, but a mean from all the stations was in reasonable agreement with one cloud formula.

4B. Meteorology

AD-A016 313/9GA PC$3.25/MF$2.25
University of Southern California Los Angeles Dept of Aerospace Engineering
Analysis of a Simple Circuit for Constant Temperature Anemometry.
Final rept. 1 Jan 74-31 Aug 75,
P. D. Weidman, and F. K. Browand. 27 Sep 74, 10p
Contract N00014-67-A-0269-0031, Grant NSF-GK-35800
Availability: Pub. in Jnl. of Physics E: Scientific Instruments, v8 p553-560 1975.

Descriptors: *Hot wire anemometers, Circuits, Velocity, Measurement, Films, Heat transfer, Low frequency, Substrates, Voltage, Circuit analysis, Reprints.
Identifiers: Hot film anemometry.

No abstract available.

AD-A016 379/0GA PC$5.75/MF$2.25
Naval Postgraduate School Monterey Calif
Radiational Parameterization for the FNWC Primitive Equation Model Using Data Over the Oceans for 16 April 1974.
Master's thesis,
William Thurman Meyers. Sep 75, 131p

Descriptors: *Air water interactions, *Radiative transfer, *Heat balance, *Albedo, Clouds, Climate, Atmospheric temperature, Moisture, Convection(Atmospheric), Computations, Theses.
Identifiers: Primitive equations, Atmsopheric transmissivity.

The radiational model used in this study computes the planetary albedo and absorption of solar insolation by the ocean's surface and by atmospheric layers for the primitive equation model of FNWC. Large-scale cloud parameterization in several layers was used in these computations. Solar insolation disposition was computed from the water-mass and the cloud amounts over each gridpoint. Long-wave cooling effects were computed using emissivity formulas after Sasamori at the earth's surface and over the same layers, and were also found to be dependent upon the cloud parameterization. Two forms of the cloud parameterization were tested using FNWC data over the oceanic gridpoints for 16 April 1974. The objective was to determine the parameterization which better verified the radiational balance as a function of latitude when compared with satellite climatology at the top of the atmosphere for the same general data-period in 1969 (after Raschke, et al, 1973). The better verification resulted with the smaller cloud parameterization values.

AD-A016 483/0GA PC$3.25/MF$2.25
Weather Wing (5th) Langley AFB Va
Probability of Rain Versus Snow Based on 1000-500MB Thickness Values,
Michael J. Roblenski. 10 Apr 73, 10p Rept no. 5WW-LFS-73-2

Descriptors: *Weather forecasting, *Atmospheric precipitation, Military facilities, Rainfall, Snow, Probability, Winter, Virginia.
Identifiers: Langley Air Force Base.

The local study describes a technique by which the 1000-500MB Thickness Values are used to forecast the type of winter precipitation expected (rain vs snow).

AD-A016 484/8GA PC$3.25/MF$2.25
Weather Wing (5th) Langley AFB Va
An Objective Technique for Forecasting Surface Wind Direction and Speed, 25KTS and Greater, at George AFB, Ca.,
Bert E. Calentine. 30 May 73, 13p Rept no. 5WW-LFS-73-3

Descriptors: *Wind, *Weather forecasting, Wind velocity, Wind direction, Military facilities, California.
Identifiers: Objective Weather forecasting, George Air Force Base.

The topographical effects of George Air Force Base are the most important single factor in determining critical wind speed and direction. Strong gusty surface wind during fall and winter months pose a most difficult forecasting problem. The general prevailing wind direction throughout the year at George is southerly. The report discusses forecasting critical wind speed and directions affecting flying operations at George AFB CA.

AD-A016 508/4GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
The Horizontal Variability of Vertically Integrated Boundary Layer Winds,
Rene V. Cormier. 6 Nov 74, 4p Rept no. AFCRL-TR-75-0524
Availability: Pub. in Jnl. of Geophysical Research, v80 n24 p3407-3409, 20 Aug 75.

Descriptors: *Wind, *Boundary layer, Air pollution, Variations, Parameters, Horizontal orientation, Vertical orientation, Integration, Reprints.

This research provides a study of the horizontal variability of integrated boundary layer winds (IBLW's) for distances of the order of miles (kilometers). This information should be helpful for both theoretical and practical applications, e.g., boundary layer parameterization and air pollution models. The study concerned itself with winds integrated to a height of 1000 ft (300 m) and made use of data from two programs in which simultaneous and horizontally separated pilot balloon wind soundings were taken, Metromex 1971 and 1972 and a 1971 NOAA program in the Oklahoma City area. Only the data from rural locations were used in this study. Pibals were released simultaneously at locations ranging in number from 4 to 8 separated by distances varying from near 5 to near 30 mi (8 to 48 km). For a given release time, IBLW wind speed and direction differences between stations were determined for all station combinations. These differences were then used to compute rms speed and direction differences as a function of station separation rounded to the nearest 5, 10, 15, 20, 25, and 30 mi (8, 16, 24, 32, 40, and 48 km). The study shows that daytime rms speed differences are relatively independent of distance. At night, IBLW speed variability increases with increasing distance. (Author)

AD-A016 574/6GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
High Frequency Temperature Fluctuations in the Atmospheric Boundary Layer.
Master's thesis,
Robert Thomas Simril. Sep 75, 56p

Descriptors: *Atmospheric temperature, Turbulence, Periodic variations, Wind, Statistical analysis, Theses, Denmark.
Identifiers: *Atmospheric boundary layer.

Turbulent temperature fluctuations in the atmospheric boundary layer measured at 2m, 7m and 23m in Riso, Denmark, were analyzed with particular emphasis placed on determining characteristics of the high frequency region of the spectra of these fluctuations. The shape of the high wave number one-dimensional temperature spectrum and an estimate of the Kolmogorov scalar constant were determined. Comparisons of high frequency spectral regions of temperature and velocity fluctuations were made.

AD-A016 648/8GA PC$4.75/MF$2.25
Defence Research Establishment Pacific Victoria (British Columbia)
The Interaction of Wind Waves and Internal Waves: Theoretical Analysis,
B. A. Hughes. Jul 75, 93p Rept no. DREP-75-3

Descriptors: *Wind, *Internal waves, *Air water interactions, Partial differential equations, Wind velocity, Time series analysis, Ocean surface, Canada, Surface waves, Ocean waves, Perturbations, Interactions.
Identifiers: Wave wave interactions.

A theoretical description is given of the behaviour of a broadband, small-amplitude wind-wave field to a perturbing internal wave velocity pattern. The theory includes the effect of the local wind. Specific predictions are made for the case of weak internal wave currents, and these predictions are compared to measurements. The theory predicts the magnitude of the mean-square-slope changes reasonably well, and it predicts the quadrant of the phases correctly. General features of the perturbed surface-wave energy spectrum integrated in an angle are also predicted reasonbly well, and comparisons are made of the theoretical and measured local integrated spectrum at roughened areas and at slick areas. Various conditions for two theoretical wind-wave spectra are used to predict the sensitivity (or magnitude of mean-square-slope change per unit-current change, suitably normalized) and phase of the slope field as functions of the wind. Representative calculations are also made to provide sensitivity and phase of mean-square height and mean-square curvature as functions of the wind. It is shown that the 'weak internal wave' analysis leads to a singular perturbation series, and a method for obtaining a uniformly valid expansion is given and explored in detail.

AD-A016 687/6GA PC$12.25/MF$2.25
Naval Weather Service Command Washington D C
Summary of Synoptic Meteorological Observations. Siberian Coastal Marine Areas. Volume 2. Area 8-Commander Islands, Area 9-Kuril Strait W, Area 10-Kuril Strait E, Area 11-Kuril Strait 400E, Area 12-Okhotsk Sea N, Area 13-Shelikhova Gulf, Area 14-Okhotsk Sea NW.
Oct 75, 522p
See also Volume 1, AD-A016 251.

Descriptors: *Marine meteorology, *Coastal regions, *Siberia, Meteorological phenomena, Air water interactions, Atmospheric precipitation, Thunderstorms, Fog, Visibility, Humidity, Atmospheric temperature, Ocean waves, Sea level, Periodic variations, Tables(Data), Okhotsk Sea.
Identifiers: Commander Islands, Kuril Strait, Shelikhova Gulf.

The data contained in these tables were obtained from tape data Family 11 (TDF-11), Marine Surface observations. TDF-11 was primarily funded by the Naval Weather Service Command and selected by NWSD Asheville as the most comprehensive collection of marine surface observations from which to develop a series of coastal marine summaries. The source was punched cards of weather observations taken aboard vessels of varying registry. They were recorded on magnetic tape in a common format.

AD-A016 719/7GA PC$4.25/MF$2.25
National Academy of Sciences Washington D C
The Ocean's Role in Climate Prediction.
Dec 74, 61p
Contract NSF-C310
Library of Congress Catalog Card No. 74-29111.
Sponsored in part by Office of Naval Research, Arlington, Va.

Descriptors: *Climate, *Marine meteorology, *Marine climatology, Ocean models, Atmosphere models, Air water interactions, North Atlantic Ocean, North Pacific Ocean, Weather forecasting.
Identifiers: Global Atmospheric Research program, Remote sensing.

This report is intended to provide an overview of the present and projected large projects currently related to the second Global Atmospheric Research Program (GARP) objective to understand the role of ocean in climate; to formulate specific questions that appear to be vital to our understanding of the role of the ocean in climate; to report on the activities that are actually taking place and to access how they stand in regard to the total task that needs to be done; and, to indicate where the first GARP Global Experiment (FGGE) provides opportunities toward understanding the ocean-atmosphere climate problem.

AD-A016 734/6GA PC$3.25/MF$2.25
Rice Univ Houston Tex Dept of Space Physics and Astronomy
The Accuracy of Acoustic Reconstructions of Lightning Channels.
Technical rept.,
A. A. Few, and Thomas L. Teer. 3 Dec 73, 8p
Rept no. TR071-753
Contract N00014-75-C-0139
Continuation of Contract N00014-67-A-0145-0004.
Availability: Pub. in Jnl. of Geophysical Research, v79 n33 p5007-5011, 20 Nov 74.

Descriptors: *Thunderstorms, *Lightning, *Acoustic measurement, *Acoustic signatures, *Atmospheric physics, Meteorological phenomena, Naval operations, Acoustic signals, Sound transmission, Aviation safety, Signal processing, Wave propagation, Naval research, Wind, Reprints.
Identifiers: *Thunder, Severe weather.

All of the sources contributing to errors in the measurement and analysis of acoustic signals recorded with an array of microphones for the purpose of determining the direction of propagation of acoustic wavelets and subsequent use of this information for reverse ray propagation to define source locations are examined and evaluated. It is found that specifying at the array the wind velocity + or - lm/s, the temperature + or - 2C, and the source range + or - 20%, is sufficient to locate atmospheric sources with an accuracy of 10%.

AD-A016 746/0GA PC$3.25/MF$2.25
Rice Univ Houston Tex Dept of Space Physics and Astronomy
Thunder.
Technical rept.,
Arthur A. Few. Sep 75, 16p Rept no. TR071-755
Contract N00014-75-C-0139
See also AD-A016 747.
Availability: Pub. in Scientific American. v233 n1 p80-90 Jul 75.

Descriptors: *Thunderstorms, *Acoustic measurement, *Lightning, *Atmospheric physics, Naval operations, Electric discharges, Acoustic signals, Aviation safety, Weather, Sound transmission, Acoustic signatures, Meteorological phenomena, Reprints.
Identifiers: *Thunder, Severe weather.

Details on how thunder is generated, propagated, and perceived are given and illustrated. Some of the important new knowledge of thunderstorms that have been gained from the use of acoustic techniques in the research of thunder signals are described, and simple techniques are enumerated for making fundamental measurements with available equipment. (Author)

AD-A016 747/8GA PC$3.25/MF$2.25
Rice Univ Houston Tex Dept of Space Physics and Astronomy
Thunder Signatures.
Technical rept.,
Arthur A. Few. Sep 75, 10p Rept no. TR071-751
Contract N00014-75-C-0139
Continuation of Contract n00014-67-a-0145-0004.
Availability: Pub. in EOS, Transactions, American Geophysical Union, v55 n5 p508-514 May 74.

Descriptors: *Thunderstorms, *Acoustic signatures, *Acoustic measurement, *Lightning, *Atmospheric physics, Weather, Naval operations, Acoustic signals, Sound transmission, Aviation safety, Naval research, Meteorological phenomena, Wave propagation, Reprints.
Identifiers: Thunder, Severe weather.

The lightning channel is an extended, tortuous, multi-branched, pulsed generator of acoustic signals. The signals so produced propagate through a sheared moving medium containing random turbulent motions and gradients both systematic and random in propagation speed. The signal suffers from refraction, reflection, absorption, scattering, and non-linear effects. The signature of thunder is unique to the lightning event, the medium, and the observer, and it contains important information on the lightning event and the atmosphere that can be discovered from an analysis of the signature. (Author)

AD-A016 850/0GA PC$5.25/MF$2.25
Saint Louis Univ Mo Dept of Earth and Atmospheric Sciences
Research to Develop Improved Models of Climatology That Will Assist the Meteorologist in the Timely Operation of the Air Force Weather Detachments,
Donald E. Martin. 30 Jun 75, 106p Rept no. Scientific-1 AFCRL-TR-75-0447
Contract F19628-74-C-0004

Descriptors: *Weather forecasting, Atmosphere models, Ceiling, Visibility, Wind, Moisture, Stochastic processes, Graphs.

This report considers the devising of climatic presentations for usage in preparing 2- and 4-hour forecasts of low ceilings and restricted visibilities. A hierarchy of empirical relationships for estimating the recurrence probabilities are made possible through the use of statistical modelling and analysis techniques which act to conserve the data base.

AD-A016 913/6GA PC$12.25/MF$2.25
Naval Weather Service Command Washington D C
Summary of Synoptic Meteorological Observations. Siberian Coastal Marine Areas. Volume 3. Area 15 - Okhotsk Sea NE, Area 16 - West Coast Kamchatka, Area 17 - Tatar Strait N, Area 18 - Tatar Strait S, Area 19 - Okhotsk Sea SW, Area 20 - Sakhalin Island SE, Area 21 - Okhotsk Sea SE.
Oct 75, 511p
See also Volume 2, AD-A106 687.

Descriptors: *Synoptic meteorology, *Marine meteorology, *Coastal regions, *Siberia, Meteorological data, Air water interactions, Climate, Humidity, Atmospheric precipitation, Fog, Cloud cover, Ceiling, Visibility, Atmospheric temperature, Thunderstorms, Wind velocity, Wind direction, Ocean waves, Okhotsk Sea, Kamchatka Peninsula, Tables(Data), Statistical data.
Identifiers: Tatar Strait, Sakhalin Island.

The data contained in these tables were obtained from tape data Family 11 (TDF - 11), Marine Surface observations. TDF-11 was primarily funded by the Naval Weather Service Command and selected by NWSD Asheville as the most comprehensive collection of marine surface observations from which to develop a series of coastal marine summaries.

AD-A016 958/1GA PC$4.75/MF$2.25
Calspan Corp Buffalo N Y
Marine Fog Studies Off the California Coast.
Annual summary rept. no. 3,
Eugene J. Mack, Roland J. Pilie, and Ulrich Katz. Mar 75, 87p Rept no. CALSPAN-CJ-5607-M-1
Contract N00019-75-C-0053
Report on Project Sea Fog.

Descriptors: *Marine atmospheres, *Fog, Coastal regions, California, Measurement, Profiles, Visibility, Temperature, Scientific satellites.
Identifiers: Sea fog project, NOAA-2 satellite.

Contents:
- Summary of marine fog occurrence off the West Coast;
- The importance of organized vertical motions in coastal fog;
- Bay fog (marine fog formation through continental influences);
- Observations of a mesoscale organization of fog occurrence off the West Coast.

COM-75-11388/6GA PC$3.75/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
Analysis of an All-Weather System for Wind Sounding up to 15 km Altitude.
Technical rept.,
R. B. Chadwick, E. E. Gossard, and R. G. Strauch. Jun 75, 43p NOAA-TR-ERL-334, WPL-41 NOAA-75091805

Descriptors: *Wind(Meteorology), *Remote sensing, *Tropopause, *Weather forecasting, Meteorological balloons, Atmospheric sounding, Radar tracking, Doppler radar, Wind velocity, Autocorrelation, Waveforms, Diagrams, Radar equipment, Tropospheric scatter communication, Design.

Foreward-scatter radio paths are analyzed as a means of remotely measuring winds to high altitudes. The propagation problem is formulated and pertinent equations are derived. A ranging technique using pseudo-noise modulation to measure the altitude of the scattering volume is described and several possible geometries and configurations are discussed. A sample design is suggested and the performance to be expected is calculated for that design. A rough estimate is given of the equipment cost for a nationwide system capable of routinely measuring winds up to 15 km.

COM-75-11404/1GA PC$3.25/MF$2.25
National Weather Service, Salt Lake City, Utah. Western Region.
A Study of Flash-Flood Occurrences at a Site Versus Over a Forecast Zone.
Technical memo.,
Gerald Williams. Aug 75, 16p NOAA-TM-NWS-WR-100 NOAA-75090802

Descriptors: *Flood forecasting, *Flooding, *Floods, Probability theory, Rainfall intensity, Predictions, Flood control, Flood plains, Weather forecasting, Utah.
Identifiers: *Flash floods.

The report describes some relations between probability of point rainfall amounts and probability of the same amounts falling some place within an area; i.e., point probability vs. areal probability. Analogously, the relationship between probability of flash-flood occurrences at sites and the probability of flash-flood occurrences somewhere within a forecast zone are also developed. The paper considers and examines unusually heavy rainfall of short duration from convective activity and its closely related partner, flash floods. Some of the conclusions drawn from the study are that the 100-year 1/2-hour amount of point rainfall probably may occur once every several years somewhere on a 60-square-mile basin. Flash-flood occurrences appear to exhibit similar relationships but over larger areas.

COM-75-11405/8GA PC$3.25/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Weather Modification Program Office.
A Comparison of 'Dynamic Seedability' Prediction with Two Cloud Models During FACE - 73.
Technical memo.,
William R. Cotton, and Albert Boulanger. Jun 75, 21p NOAA-TM-ERL-WMPO-22 NOAA-75091001

Descriptors: *Cloud seeding, *Weather modification, Cloud physics, Cumulus clouds, Mathematical models, Predictions, Confidence limits.
Identifiers: Florida area cumulus experiment, EMB model, PSU 71 model.

Seedability predictions of the EMB one-dimensional cumulus model are compared with those of the PSU 71 model for July 1973 during the Florida Area Cumulus Experiment (FACE) conducted by the Experimental Meteorology Laboratory. It was found that the EMB model generally predicts a higher magnitude max-

imum seedability and at a larger cloud radius than does the PSU 71 model. Neither cloud model showed a clearcut superiority over the other as an aid to the decision process involved in the operation of a weather modification experiment.

COM-75-11408/2GA Not available NTIS
Wisconsin Univ., Madison. Space Science and Engineering Center.
Studies of the Atmosphere Using Aerospace Probes 1974.
Annual scientific rept.,
Verner E. Suomi. Mar 75, 158p ISBN-0-299-97056-6 NOAA-75080503
Grant NOAA-04-3-158-61
See also report dated Apr 74, COM-74-11626.
Paper copy available from University of Wisconsin Press, Box 1379, Madison, Wisc. 53701, $5.00.

Descriptors: *Synoptic meteorology, *Atmospheric disturbances, *Tropical atmospheres, *Meteorological probes, Clouds(Meteorology), Storms, Tropical cyclones, Cloud cover, Squalls, Monsoons, Turbulence, Remote sensing, Meteorological balloons, Weather forecasting, Scientific satellites, North Atlantic Ocean, Spaceborne photography, India, Oceans.
Identifiers: ATS-3 satellite.

Contents:
Cloud bubbles and squalls;
The anatomy of an Atlantic tropical disturbance;
A study of satellite-derived cloudiness during the Indian summer monsoon;
Temporal cloud statistics over the Asian monsoon region and adjacent areas during
the summer;
Observations of convective scale turbulence over the tropical ocean.

COM-75-11420/7GA PC$3.75/MF$2.25
National Weather Service, Salt Lake City, Utah. Western Region.
Climate of Stockton, California.
Technical memo.,
Robert C. Nelson. Sep 75, 32p NOAA-TM-NWS-WR-79 NOAA-72082505

Descriptors: *Climate, *Precipitation(Meteorology), Weather observations, Atmospheric temperature, Humidity, Fog, Cloud cover, Tables(Data), California.
Identifiers: *Stockton(California).

Stockton is located near the center of the Great Central Valley of California, on the southeast corner of the delta formed by the confluence of the San Joaquin and Sacramento Rivers. Precipitation records began in 1851 and temperature records started in 1871. The climate is characterized in summer by warm, dry days and relatively cool nights with clear skies and no rainfall. In the winter, mild temperatures and relatively light rains, with frequent heavy fogs, are characteristic of the area. Tabulated data for averages and extremes of temperature, precipitation, wind, and clouds for the Stockton area are given.

COM-75-50575/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Automatic Digital Microwave Hygrometer.
Final rept.,
Saburo Hasegawa, and Daniel P. Stokesberry. Jul 75, 7p
Sponsored in part by Naval Air Systems Command, Washington, D.C.
Pub. in Review of Scientific Instruments, v46 n7 p867-873 Jul 75.

Descriptors: *Hygrometers, Microwave refractometers.
Identifiers: Reprints.

The hygrometer is designed to measure the humidity of atmospheric air over the vapor pressure range 3-7400 Pa (0.03-74 mbar). The instrument is an adaptation of a microwave refractometer using two cavities operating at 12 GHz. One cavity is exposed to the moist test air and the other is exposed to the same air sample with all the water vapor removed. Both cavities are maintained at the same fixed temperature in a thermostated oven and at the same total pressure. The difference in frequency between the cavities is automatically nulled by a tuning probe in the sampling cavity. The instrument was calibrated by two independent methods. One involved the measurement of the resonance frequency of the sampling cavity as a function of probe penetration and using this in a theoretically derived equation for vapor pressure. The second involved the measurement of the probe penetration as an empirical function of known vapor pressure of a test gas. These two methods yielded results which agreed on the average to better than 0.5% for vapor pressures up to 3050 Pa (30.5 mbar).

COM-75-90008-09/GA MF$2.25
National Oceanic and Atmospheric Administration, Washington, D.C. Environmental Data Service.
Mariners Weather Log. Volume 19, Number 5, September 75,
Elwyn E. Wilson. Sep 75, 67p NOAA-75091701
Paper copy available free to persons or agencies with a marine interest from the Environmental Data Service, Page Bldg. 1 (D762), 2001 Wisconsin Ave., N.W., Washington, D.C. 20235.

Descriptors: *Hurricanes, *Cloud seeding, *Weather modification, *Ice reporting, *Great Lakes, Tropical cyclones, Ice navigation, Ice breakup, Cloud physics, Precipitation(Meteorology), Storms.
Identifiers: Stormfury project.

This periodical, put out by the Environmental Data Service, includes articles on (1) Project Stormfury (2) Great Lakes ice season 1974-75 (3) Gulfstream. It also contains sections on; Hints to the Observer, Tips to the Radio Officer, Hurricane Alley, On the Editor's Desk, Marine Weather Review, and Marine Weather Diary.

COM-75-90008-09-01/GA
(Order as COM-75-90008-09)
National Oceanic and Atmospheric Administration, Miami, Fla. Environmental Research Labs.
Project STORMFURY. Hurricanes - Can Their Destructive Force Be Reduced,
Robert C. Sheets. Sep 75, 9p NOAA-75091701-1
Included in Mariners Weather Log, v19 n5 p269-276 Sep 75.

Descriptors: *Hurricanes, *Cloud seeding, *Weather modification, *Tropical cyclones, Wind velocity, Turbulence, Storms, Cloud physics, Precipitation(Meteorology), Damage.
Identifiers: Stormfury project.

This article deals with the NOAA Project entitled Project STORMFURY. The project was formed in 1962 as a cooperative venture of the Department of Defense and the Department of Commerce. Its objective is to investigate ways for man to alter tropical cyclones beneficially. STORMFURY hypothesis has been developed from the project and is presented and examined in this article.

COM-75-90008-09-02/GA
(Order as COM-75-90008-09)
National Weather Service, Cleveland, Ohio.
Great Lakes Ice Season, 1974-75. Year Round Navigation Achieved,
Daron Boyce, and Bernard DeWitt. Sep 75, 7p NOAA-75091701-2
Prepared in cooperation with DeWitt (Bernard) and Associates, Ann Arbor, Mich.
Included in Mariners Weather Log, v19 n5 p277-282, Sep 75.

Descriptors: *Great Lakes, *Ice reporting, Seasonal variations, Ice navigation, Ice breakup.
Identifiers: *Lake ice.

This article describes the Great Lakes Ice Season for 1974-75. The 1974-75 Great Lakes Ice Season, like the previous three seasons, was warmer than normal. Considerably less navigationally significant ice formed than normal. The lack of ice and national economic pressures pushed shipping traffic through Great Lakes water with only minor stoppages and resulted in the first year-round navigation season.

N75-31663/8GA PC$7.50/MF$2.25
Colorado State Univ., Fort Collins. Fluid Dynamics and Diffusion Lab.
An Investigation of Turbulent Transport in the Extreme Lower Atmosphere.
C. A. Koper, Jr., and W. Z. Sadeh. Aug 75, 240p NASA-CR-2567
Contract NAS8-28590

Descriptors: *Heat exchangers, *Lower atmosphere, *Turbulent flow, Atmospheric models, Autocorrelation, Hot-wire anemometers.

For abstract, see STAR 1322

N75-31664/6GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Interactive Image Processing for Meteorological Applications at NASA/Goddard Space Flight Center.
J. B. Billingsley, and A. F. Hasler. Apr 75, 14p
NASA-TM-X-70964, X-933-75-97
Conf-Presented at the Machine Processing of Remotely Sensed Data Conf., Lafayette, Ind., 3-5 Jun. 1975.

Descriptors: *Data processing, *Geos satellites (Esro), *Imagery, *Weather forecasting, Meteorology, Satellite observation.

For abstract, see STAR 1322

N75-31665/3GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, Juin 1973.
Monthly Bulletin, Jun. 1973.
Jun 73, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Periodic variations, Radiosondes.

For abstract, see STAR 1322

N75-31666/1GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, Juillet 1973.
Monthly Bulletin, Jul. 1973.
Jul 73, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Periodic variations, Radiosondes.

For abstract, see STAR 1322

N75-31667/9GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, Aout 1973.
Monthly Bulletin, Aug. 1973.
Aug 73, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Periodic variations, Radiosondes.

For abstract, see STAR 1322

N75-31668/7GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, Septembre 1973.
Monthly Bulletin, Sep. 1973.
Sep 73, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Periodic variations, Radiosondes.

For abstract, see STAR 1322

N75-31669/5GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, Octobre 1973.
Monthly Bulletin, Oct. 1973.
Oct 73, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Periodic variations, Radiosondes.

For abstract, see STAR 1322

N75-31670/3GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Climatological Observations Observations Climatologiques Bulletin Mensuel, Mai 1974.
Monthly Bulletin, May 1974.
May 74, 15p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, *Tables (Data), Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Wind (Meteorology).

For abstract, see STAR 1322

N75-31671/1GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Climatological Observations Observations Climatologiques Bulletin Mensuel, Juillet 1974.
Monthly Bulletin, Jul. 1974.
Jul 74, 15p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, *Tables (Data), Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Wind (Meteorology).

For abstract, see STAR 1322

N75-31672/9GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Climatological Observations Observations Climatologiques Bulletin Mensuel, Septembre 1974.
Monthly Bulletin, Sep. 1974.
Sep 74, 15p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, *Tables (Data), Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Wind (Meteorology).

For abstract, see STAR 1322

N75-31673/7GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Climatological Observations Observations Climatologiques Bulletin Mensuel, Octobre 1974.
Monthly Bulletin, Oct. 1974.
Oct 74, 15p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Tables (Data), Wind (Meteorology).

For abstract, see STAR 1322

N75-31674/5GA PC$4.25/MF$2.25
World Meteorological Organization, Geneva (Switzerland).
Review of Urban Climatology, 1968 - 1973.
T. R. Oke. 1974, 53p WMO-383, TN-134
Conf-Presented at the 6TH Session of the Wmo Comm. For Spec. Appl. Of Meteorology and Climatology, Bad Homburg, West Ger., 8-19 Oct. 1973.

Descriptors: *Atmospheric heat budget, *Cities, *Climatology, *Water balance, Atmospheric circulation, Atmospheric models, Humidity, Long wave radiation, Precipitation (Meteorology), Short wave radiation, Wind (Meteorology).

For abstract, see STAR 1322

N75-31675/2GA PC$4.25/MF$2.25
Fondazione Ugo Bordoni, Rome (Italy).
Measurements of the Precipitation Intensity within the Research Program on Radiowave Propagation at Frequencies Higher Than 10 Ghz Misure di Intensita di Precipitazione Nell' Ambito Del Programma di Ricerca Sulla Radiopropagazione a Frequenze Superiori a 10 Ghz.
F. Fedi, U. Merlo, and B. Peroni. 28 Sep 74, 59p
Language in Italian.

Descriptors: *Atmospheric attenuation, *Capacitance, *Precipitation (Meteorology), *Rain gages, *Superhigh frequencies, Acquisition, Error analysis, Performance tests, Radio waves.

For abstract, see STAR 1322

N75-31677/8GA PC$8.50/MF$2.25
World Meteorological Organization, Geneva (Switzerland).
World Weather Watch: Consolidated Report on the Voluntary Assistance Programme Including Projects Approved for Circulation in 1974.
Jan 75, 267p WMO-404, ISBN-92-63-10404-2

Descriptors: *International cooperation, *Meteorology, Education, Meteorological services, Project planning, Requirements, Weather stations.

For abstract, see STAR 1322

N75-31678/6GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, MARS 1974.
Monthly Bulletin, Mar. 1974.
Mar 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Periodic variations, Radiosondes.

For abstract, see STAR 1322

N75-31679/4GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, Avril 1974.
Monthly Bulletin, Apr. 1974.
Apr 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Meteorological parameters, Periodic variations, Radiosondes.

For abstract, see STAR 1322

N75-31680/2GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, Mai 1974.
Monthly Bulletin, May 1974.
May 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Meteorological parameters, Periodic variations, Radiosondes.

For abstract, see STAR 1322

N75-31681/0GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Climatological Observations Observations Climatologiques Bulletin Mensuel, Fevrier 1975.
Monthly Bulletin, Feb. 1975.
Feb 75, 16p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, *Tables (Data), Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Wind (Meteorology).

For abstract, see STAR 1322

N75-31682/8GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Climatological Observations Observations Climatologiques Bulletin Mensuel, MARS 1975.
Monthly Bulletin, Mar. 1975.
Mar 75, 16p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, *Tables (Data), Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Wind (Meteorology).

For abstract, see STAR 1322

N75-31683/6GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.

Climatological Observations Observations Climatologiques Bulletin Mensuel, Avril 1975.
Monthly Bulletin, Apr. 1975.
Apr 75, 16p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Tables (Data), Wind (Meteorology).

For abstract, see STAR 1322

PB-245 633/3GA PC$7.50/MF$2.25
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Workshop for an Assessment of the Present and Potential Role of Weather Modification in Agricultural Production, Held at Ft. Collins, Colorado on 15-18 July 1975,
Lewis O. Grant, and John D. Reid. Aug 75, 242p
AS-Paper-236
Sponsored by National Science Foundation, Washington, D.C.

Descriptors: *Agriculture, *Weather modification, Meetings, Precipitation(Meteorology), Farm crops, Seasonal variations, Harvesting, Forest trees, Forest fires, Cloud cover, Lightning.

The broad objective of the assessment of the present and future role of weather modification in agricultural production is to make an authoritative evaluation of the present and potential role that weather modification can take in increasing national and world agricultural production. A specific objective includes the preparation of an authoritative document that can receive wide distribution and provide for extensive utilization of the results of the assessment. The actual assessment is being carried out in several stages. The principal investigators, with the aid of advisors and consultants, have organized and conducted the workshop to identify the needs of agriculture and the capabilities and risks of weather modification. This report is a compilation of the workshop materials.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A016 338/6GA PC$6.25/MF$2.25
Naval Postgraduate School Monterey Calif
Project Manager and Test and Evaluation Facility Relationship.
Master's thesis,
Kenneth Dean Aanerud, John Edward Kane, and Michael Bernard Kelley. Sep 75, 161p

Descriptors: *Naval shore facilities, *Management, *Test facilities, Weapon systems, Acquisition, Organizations, Finance, Questionnaires, Perception(Psychology), Management planning and control, Theses, Interactions, Executives.
Identifiers: Centers, Capability, Managers.

This thesis investigates the relationship between Washington based project managers and a test and evaluation (T and E) facility, the Pacific Missile Test Center (PMTC). Five areas of the relationship are examined. First, the formal weapon system acquisition process as prescribed by current directives is presented as an overview. Next, the Pacific Missile Test Center organization is analyzed. This is followed by an investigation of funding techniques, and specifically, those employed by PMTC. The project managers' perception of their participation in the T and E process is presented through results of a questionnaire. An objective method of selecting the appropriate T and E facility for a project based on technical capability is developed.

AD-A016 373/3GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
A Multi-Resource Leveling Algorithm for Project Networks.
Master's thesis,
ChungUng Lee. Sep 75, 32p

Descriptors: *Management planning and control, *Scheduling, Network flows, Mathematical models, Algorithms, Theses.
Identifiers: *Project management, PERT, Critical path method.

This thesis presents a modification and extension to the Burgess and Killebrew heuristic resource leveling procedure for project networks. In contrast to previous algorithms appearing in the literature, the objective function of this algorithm is the minimization of the sum of the squared errors in each time period (deviations around the mean usage) of all resources over the duration of the project. This objective function continues the search for an improved schedule beyond that of previous algorithms with their associated objective functions. One important feature is that the algorithm tends to reduce the number of periods that a resource is idle during its duration on the project.

AD-A016 452/5GA PC$3.75/MF$2.25
Dikewood Corp Albuquerque N Mex
Concept of a Management Information System for TESPO.
Final rept.,
B. G. VanBlaricum, and June G. Brenton. Oct 75, 45p Rept no. DC-TR-1242-1 AFSWC-TR-75-5
Contract F29601-74-C-0022

Descriptors: *Management information systems, Computer programming, Costs, Time sharing, Real time.
Identifiers: Burroughs 3500 computers, CDC 6600 computers.

In a recent survey of available Management Information Systems, three systems that can most nearly fulfill the requirements of the Test and Evaluation System Program Office (TESPO) were selected for detailed investigation. The results of the survey and study are given in this report. The conclusion is drawn that the TESPO should select one of the three for implementation to assist with management of the Near-Term COR development and that the operating MIS be improved as experience is gained through operation and methods of improvement are further explored.

AD-A016 497/0GA PC$3.75/MF$2.25
Rand Corp Santa Monica Calif
An Analyst's View of the Uses and Abuses of Modeling for Decisionmaking,
Garry D. Brewer. Jan 75, 30p Rept no. P-5395

Descriptors: *Management planning and control, *Decision making, Methodology, Game theory, Models, Simulation, Utilization, Assessment, Deficiencies.
Identifiers: Responsibility, Recommendations.

The report discusses the question of whether or not models, simulations, and games (MSGs) are being used to advantage by policymakers. Although these techniques are being used extensively, close inspection of much of the activity reveals a divergence between those who build MSGs and those who use them for policy making. Users are characterized as inadequately trained to know what they are buying; the experts responsible for the models are criticized for not assuming responsibility for their products. Ameliorative measures are suggested.

AD-A016 775/9GA PC$3.75/MF$2.25
Dikewood Corp Albuquerque N Mex
Computer-Based System for Control and Dissemination of Routine Management Actions and Notices.
Final rept.,
B. G. VanBlaricum. Oct 75, 49p Rept no. DC-TR-1242-13 AFSWC-TR-75-4
Contract F29601-74-C-0022

Descriptors: *Management engineering, *Computer applications, Management information systems, Records, Control systems, Organizations, Reports, Data processing, Meetings, Forms(Paper), Manuals, Automation, Distribution.

To curtail the inevitability of 'losing' any of the multitudinous assignments which must be accomplished in the course of fulfilling an overall mission, a formalized method of communication, as well as an established record-keeping facility, are enabled in the computer-based system for control and dissemination of management actions and general information notices. Those assignments are routed from and to the relevant sub-groups with a summary capability for use of top management. Incorporation of this management vehicle resulted in the successful intercommunication and cross-correlation of the huge array of tasks associated with the operation of a multi-staffed management organization.

AD-A016 788/2GA PC$5.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Construction Equipment Cost Guide. Volume 1.
Final rept.
E. Neely. Oct 75, 108p Rept no. CERL-TR-P-52-Vol-1
See also Volume 2 dated Oct 75, AD-A016 910.

Descriptors: *Construction equipment, *Cost analysis, Contracts, Government procurement, Salaries, Rates, Operators(Personnel), Contract administration, Economic analysis, Profits.
Identifiers: *Construction management, *Ownership costs.

The purpose of this guide is to assist field pricing support personnel (estimators, negotiators, price analysts, auditors, etc.) in estimating construction equipment hourly ownership and operating rates. The guidance provided is in accordance with general concepts of the contract cost principles and procedures in Armed Services Procurement Regulations (ASPR Section 15) and Federal Procurement Regulations (FPR Part 1-15). The manual is intended for use in negotiated construction procurements which require an independent government estimate by regulation. The original construction contract is awarded as a result of an advertised procurement while contract modifications to advertised procurements are negotiated. The cost estimating concepts of these two procurement types are different.

AD-A016 910/2GA PC$25.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Construction Equipment Cost Guide. Volume 2.
Final rept.,
E. Neely. Oct 75, 1089p Rept no. CERL-TR-P-52-Vol-2
See also Volume 1 dated Oct 75, AD-A016 788.

Descriptors: *Construction equipment, *Cost analysis, Contracts, Government procurement, Salaries, Rates, Operators(Personnel), Contract administration, Economic analysis, Profits.

Identifiers: *Construction management, *Ownership costs.

This guide presents a systematic approach for Department of the Army field pricing support personnel (estimators, negotiators, price analysts auditors, etc.) to use in estimating hourly ownership and operating rates for construction equipment. The guide is intended for use in negotiated construction procurements which require an independent government estimate by regulation.

AD-A016 930/0GA PC$9.50/MF$2.25
Air Force Systems Command Washington D C
Air Force Systems Command Research Planning Guide (Research Objectives).
1 May 75, 342p Rept no. AFSC-TR-75-01

Descriptors: *Air Force planning, *Technology, Human resources, Environmental protection, Human factors engineering, Materials, Environments, Aerospace systems, Propulsion systems, Electric power, Weapon systems, Electronic equipment, Air Force research, Manuals.
Identifiers: Objectives.

Desired objectives are given for Air Force research activities in support of seven technology areas.

AD-A016 945/8GA PC$7.50/MF$2.25
Burns and Mcdonnell Kansas City Mo
Manufacturer's Catalog Data of Automation and Surveillance Systems for Utility Plants at Fort Leonard Wood, Missouri, Volume 2.
30 Apr 75, 249p Rept no. 74-051-Vol-2
Contract DACA45-74-C-D108
See also volume 1 dated 30 Apr 75, AD-A013 410.

Descriptors: *Energy management, *Data processing, *Catalogs, *Control systems, *Computer applications, Automation, Water treatment, Water distribution, Sewage disposal, Space heaters, Air conditioning equipment, Public utilities, Military facilities.
Identifiers: Fort Leonard Wood, Municipal engineering.

Automation and surveillance systems for utility plants at Fort Leonard Wood, Missouri are discussed. This report contains manufacturers' catalog data.

AD-A016 966/4GA PC$4.25/MF$2.25
Iowa State Univ Ames Dept of Sociology and Anthropology
Creating Interorganizational Coordination: Project Report.
Final rept. 28 Aug 73-31 May 75,
Gerald E. Klonglan, Charles L. Mulford, Richard D. Warren, and Judy M. Winkelpleck. May 75, 73p Rept no. Sociology-122A
Contract DCPA01-74-C-0033

Descriptors: *Emergencies, *Civil defense, Organizations, Cooperation, Management planning and control, Training.

The report describes a research utilization effort designed to synthesize the existing research knowledge about Interorganizational Coordination and to develop preliminary training and orientation materials that could be used to teach relevant personnel how to create effective coordination. Phase 1 included an exhaustive study of past interorganizational coordination efforts. The product of Phase 1 was a two day seminar where the body of knowledge relating to interorganizational coordination was presented and the potential usefulness of this knowledge for civil preparedness evaluated. Phase 2 of the project included the development of preliminary orientation and training materials that could be used to create effective interorganizational coordination. The product of Phase 2 was a two day training demonstration seminar on interorganizational coordination.

AD-A016 984/7GA PC$4.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Development of Heuristic Procedures to Analyze the Production-Transportation Problem.
Technical manuscript,
Edward J. Worrel, III, and Gary L. Hogg. Oct 75, 74p Rept no. CERL-TM-D-61

Descriptors: *Management planning and control, *Industrial production, *Distribution theory, Inventory control, Transportation, Network flows, Cost analysis, Computerized simulation, Mathematical models, Decision making, Heuristic methods.
Identifiers: Transportation models, Out of kilter algorithm.

A methodology has been developed to systematically analyze a production-transportation problem subject to stochastic demand. First the problem is transformed into a network flow equivalent. Then flow data are generated through a series of simulation runs, using a simulation program developed around the out-of-kilter algorithm, GASP II subroutines, and demand determined by Monte Carlo procedures. The data are then interpreted using developed procedures to determine plant market pairs which could be candidates for increase/decrease of flow depending on established conditions. An example problem is provided to demonstrate the usefulness of the methodology and the data available after a simulation run. The example problem has been constructed with production costs and transportation costs between any plant-market pair being nonlinear.

N75-31924/4GA PC$15.25/MF$2.25
Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.
Detailed Requirements Document for the Interactive Financial Management System (Ifms), Volume 1.
D. B. Dodson. Jul 75, 674p NASA-CR-144423, LEC-1625-VOL-1
Contract NAS9-12200

Descriptors: *Computer systems design, *Financial management, *Requirements, Management information systems, Resource allocation.

For abstract, see STAR 1322

PB-245 269/6GA PC$10.50/MF$2.25
Mathematica, Inc., Bethesda, Md.
A Guide to Models in Governmental Planning and Operations.
Final rept.,
Saul I. Gass, and Roger L. Sisson. Aug 74, 414p* EPA/600/5-74/008
Contract EPA-68-01-0788

Descriptors: *Public administration, *Decision making, *Planning, Models, National government, State government, Local government, Policies, Services, Air pollution, Social welfare, Water resources, Management, Urban development, Econometrics, Transportation, Law enforcement, Criminal law, Education, Energy.
Identifiers: Solid waste disposal, Government officials.

This report is directed toward the majority of governmental (federal, state, and local) officials and their staffs who are confronted with the continuing task of selecting solutions and of making decisions in societal areas. The report is divided into 12 major chapters on models and model building. Each chapter is basically self-contained, with model concepts and terminology. The Guide is an attempt to present to a non-technical governmental-oriented audience an overview of what models are, and how they have been used in a number of important social-urban areas. It represents a source from which governmental officials and others can obtain an understanding of this approach to decision making.

PB-245 554/1GA PC$10.00/MF$2.25
California Univ., Berkeley.
Technological Change, Product Proliferation and Consumer Decision Processes. Volume 6. Information Retrieval. Volume 7. Annotated Bibliographies.
Final rept.,
F. M. Nicosia, L. Harzfeld, and A. Levitt. Aug 74, 358p* NSF/RDA-73/13-14/6
Grants NSF-RDA73-07242, NSF-RDA73-07243
Prepared in cooperation with Columbia Univ., New York.

Descriptors: *Consumers, *Decision making, Bibliographies, Product development, Marketing, Demand(Economics), Technology innovation, Production control, Competition, Regulations.
Identifiers: Consumer products.

The volume contains the annotated bibliography of literature relating to the social, psychological, economic, and political aspects of consumer product proliferation resulting from technological change. The volume also contains an Appendix that describes the coding rules followed by the reviewers of the literature.

5B. Documentation and Information Technology

AD-A016 388/1GA PC$6.25/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
The Informational Differences Between the Department of Defense Sponsored and Civilian-Sponsored Management Information Systems.
Master's thesis,
Patrick R. Ray, and David W. Spicer. Aug 75, 154p Rept no. SLSR-11-75B

Descriptors: *Management information systems, Military requirements, Industries, Management planning and control, Decision making, Contracts, Cost analysis, Theses.

The Department of Defense has established an elaborate set of criteria (Cost/Schedule Control System Criteria - C/SCSC) which must be satisfied by a contractor's management information system before the award of a major weapon system contract. Meanwhile, many of these contractors continue to use much less elaborate, but not necessarily less effective, privately developed information systems to manage equivalent major non-military projects. In many cases, the contractor actually manages the weapon system contract with his own system, supporting the government system simply to satisfy contractual requirements. This research is a first step in analyzing the need for such an elaborate DOD criteria.

AD-A016 443/4GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
Analysis of the Naval Supply Corps Newsletter as a Means of Information Transfer.
Master's thesis,
George Dedrick Outlaw, Jr. Sep 75, 64p

Descriptors: *Information, *Transfer, Newspapers, Naval logistics, Public opinion, Surveys, Questionnaires, Theses.

The purpose of this study was to evaluate the Naval Supply Corps Newsletter as a medium of information transfer. As such, the readers' opinions of its usefulness, interest, and editorial aspects of readability and timely receipt reflect their perception of the Newsletter as a medium of information exchange. A questionnaire was developed and distributed to two thousand recipients of the Newsletter. Eight hundred and nine responses were used as a data base for computation. The data was analyzed using the computer program 'Statistical Package for the Social Sciences.' The results and analyses are presented.

AD-A016 500/1GA PC$5.25/MF$2.25
Defense Documentation Center Alexandria Va
Declassified AD Document Index.
Nov 75, 120p Rept no. DDC/TR-75/6

Descriptors: *Documents, *Classification, Reports, Indexes.
Identifiers: Declassified documents.

This consolidated index, in AD number order, lists over 46,000 technical reports originally accessioned by DDC as classified, but later declassified by automatic time-phased regrading action or by specific reclassification review. The index covers the last 16 years of classified document input in the DDC collection.

AD-A016 679/3GA PC$3.25/MF$2.25
Defence Scientific Information Service Ottawa (Ontario)
An Outline of Canada's Defence Scientific Information Service.
Technical memo.,
D. A. Ross. Sep 74, 22p Rept no. DSIS-TM-3/74(ODG)

Descriptors: *Information systems, Microfiche, Literature surveys, Distribution, Documents, Data processing terminals, Libraries, Canada.
Identifiers: Information services.

A Canadian defense-oriented scientific information service which collects and disseminates Canadian and foreign scientific and technical information for Canada's defense community is described. Information services such as the current awareness KWOC Index, document digests, and selective dissemination of information (SDI) programs are discussed and the development of the 'on-line' DSIS retrospective search system is described. The transition from hard copy to microform dissemination is mentioned and the use of minicomputers and the study of a possible information analysis center in the Defence Scientific Information Service (DSIS) are outlined as part of the research and development activities of DSIS. Some comments on the future development of information technology for Canada's defense community are offered.

COM-75-11409/0GA PC$3.75/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.
Scientific and Technical Publications of the Environmental Research Laboratories: Fiscal Year 1974 (July 1, 1973 through June 30, 1974).
Oct 74, 29p NOAA-75091002
See also report dated Apr 74, COM-74-50752.

Descriptors: *Indexes(Documentation), Bibliographies, Meteorology, Oceanography, Seismology, Geomagnetism, Geodesy, Ionosphere, Aerospace environment, Documents, Periodicals, Technical reports.

The report is an index to the scientific and technical reports and papers of the Environmental Research Laboratories for the period July 1, 1973, through June 30, 1974. The list includes all known publications in journals for this period, as well as those published within the official report series of the laboratories. Publications resulting from research contracts or grants, and work done by cooperating institutes or on international aid programs are included as well.

COM-75-11424/9GA PC$4.75/MF$2.25
National Oceanic and Atmospheric Administration, Rockville, Md. Scientific and Documentation Div.
A Plan for an Oceanic and Atmospheric Scientific Information System (OASIS),
Robert R. Freeman. 30 Apr 71, 93p NOAA-75102305

Descriptors: *Information systems, Project planning, Information retrieval, Objectives, Computer programming, Meteorology, Oceanography, Fisheries, User needs.
Identifiers: OASIS(Oceanic and Atmospheric Scientific Information System), Oceanic and atmospheric scientific information system.

The report describes a plan for a set of information centers, a central management and processing facility, and a set of arrangements for coordination with related systems and for strengthening, amplifying, and automating some existing information services in the marine, atmospheric, and allied sciences. Products and services discussed are comprehensive abstracting and indexing data bases, topical and area bibliographies and critical reviews, personalized information retrieval on demand, and document delivery.

COM-75-50141-09/GA PC-GPO/MF$2.25-NTIS
National Bureau of Standards, Washington, D.C.
Dimensions/NBS. Volume 59, Number 9, September 1975.
Monthly pub.
Sep 75, 25p NBS/DIM-59/9
Library of Congress Catalog Card no. 25-26527.
See also report dated Aug 75, COM-75-50141-08.
Paper copy available from GPO on subscription or per copy. Order this copy as C13.13:59/9.

Descriptors: *Research projects, *Periodicals, Data processing security, Cryptology, Construction materials, Weather, Plastic pipes, Cryogenics, Optical spectra, Thermal conductivity, Energy forecasts.
Identifiers: Technical news bulletins.

This monthly magazine features short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications. The table of contents for the current issue is: Data protection through cryptography; Determining the effect of weather on building materials; Plastic pipes, pros and cons; Energy needs newest challenge to yankee ingenuity; Highlights; Cryogenic fluid safety data compiled; Optical spectra table revised; Energy labeling explained for consumers; NBS, GSA experiment for savings and product improvement; Thermal conductivity discussed; Computer program announced.

NTIS/PS-75/813/6GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Interlibrary Loans (A Bibliography with Abstracts).
Rept. for 1964-Nov 75,
Carolyn Shonyo. Nov 75, 67p*

Descriptors: *Bibliographies, *Libraries, Acquisition, Universities, State government, Automation, Cost effectiveness, Teletypewriter systems, Telecommunication.
Identifiers: *Interlibrary loans, Medical libraries, *Loans.

The bibliography summarizes studies concerning interlibrary loans at state, university, and medical libraries; manual and automatic methods; use of teletype networks for interlibrary communication; and cost effectiveness of interlibrary loans. (Contains 62 abstracts)

N75-31934/3GA PC$3.00
National Aeronautics and Space Administration, Washington, D.C.
Nasa Patent Abstracts Bibliography: A Continuing Bibliography. Section 1: Abstracts.
Jul 75, 63p NASA-SP-7039(07)

Descriptors: *Abstracts, *Bibliographies, *Nasa programs, *Patents, Catalogs (Publications), Diagrams, Inventions.

For abstract, see STAR 1322

N75-31935/0GA PC$5.00
National Aeronautics and Space Administration, Washington, D.C.
Nasa Patent Abstracts Bibliography: A Continuing Bibliography. Section 2: Indexes.
Jul 75, 489p NASA-SP-7039(07)

Descriptors: *Abstracts, *Bibliographies, *Nasa programs, *Patents, Catalogs (Publications), Indexes (Documentation), Inventions.

For abstract, see STAR 1322

PB-245 218/3GA PC$4.25/MF$2.25
Naval Research Lab., Washington, D.C.
Report of NRL Progress.
Jun 75, 55p
Also available on subscription $40.00/year domestic, $50.00/year foreign.

Descriptors: *Naval research, *Superconductivity, Pressure, Signal processing, Materials, Alloys, Fracture(Mechanics), Solid state physics, Oceanography, Radar, High pressure.

Contents: High pressure effects in superconductivity; Progress notes - (Communications sciences, Engineering materials, Material sciences, Ocean sciences, Ocean technology, Radar); Papers by NRL staff members; Patents; Reader service.

PB-245 278/7GA PC$4.75/MF$2.25
California Univ., Davis. Water Resources Center.
Directory of Water Resources Expertise.
Aug 75, 85p* W75-11580, OWRT-A-999-CAL(10)

Descriptors: *Scientists, *Directories, Engineers, Water resources, Professional personnel, Universities, California.

The objective is to identify as nearly as possible those faculty and staff scientists in the University of California actively investigating one or more aspects of water resources problems. The Directory may be used as a means of direct contact with the investigator or as a means of identifying those who have published results of research investigations. The Water Resources Center maintains two specialized collections of published and archival research reports in which are located many of the publications and studies of scientists listed in the Directory. The primary collection is on the Berkeley Campus and the smaller, more regionally-oriented collection, is on the Los Angeles Campus.

PB-245 281/1GA PC$7.00/MF$2.25
California State Univ., Los Angeles. School of Business and Economics.

Environmental Indices for the Los Angeles Database.
Final rept.,
D. G. Malcolm, J. M. Hemphill, J. E. Gessford, P. Hanson, and D. Macdonald. Mar 75, 198p
EPA/600/5-75-017
Grant EPA-R802757

Descriptors: *Information systems, *Environmental surveys, *Data acquisition, Water resources, Waste disposal, Air pollution, Noise(Sound), Land use, Indexes(Ratios), Data processing, Standards, Urban areas, California, Monitoring.
Identifiers: Air quality data, Water quality data, *Los Angeles(California), Local studies, Data collection.

The purpose of the project was to expand the scope of the analyses being made by the Community Analysis Bureau (CAB) of the city of Los Angeles to include measures of environmental quality, which included indicators of air quality, noise, water quality and quantity, land use, handling of solid waste and energy use. The project team surveyed federal, state, county and city agency data sources and located the data needed to implement a set of indices similar to the Initial System of indices designed and developed for the county of San Diego by the IREM project in 1973. A two-state statistical analysis technique, called 'matrix analysis', is described. This technique identifies urban areas that share many common characteristics, including the environmental qualities measured by the indices. Government policies and programs that meet the needs of each type urban area are then developed. The relationships between energy use and environmental problems are described. Various organizational problems noted by the project team that prevent effective environmental information systems and management are reported.

PB-245 311/8GA PC$4.75/MF$2.25
Transportation Research Board, Washington, D.C.
Design Concepts for a National Network of Transportation Research Information Services (TRISNET).
Final rept. Jul 74-Jul 75.
Jul 75, 86p DOT-TST-76-30
Contract DOT-OS-40022

Descriptors: *Information systems, *Transportation, Information retrieval, Documents, Abstracts, Design, Document announcement, Network flows, Coordination.

TRISNET is a coordinated network of libraries, document repositories, abstracting and indexing services and other types of information centers that provide information services to users of transportation research information. The purpose of TRISNET is to provide optimum access to needed information-through the cooperative efforts of existing services and new services that are needed for completing the network. Expected benefits to users include easier and more economic access to the full range of transportation research information via TRISNET services and products, and faster and more reliable response to inquiries and requests.

PB-245 665/5GA PC$4.25/MF$2.25
Battelle Columbus Labs., Ohio.
A Critical Review of Research Related to the Economics of the Scientific and Technical Information Industry.
Final rept. Apr 74-Mar 75,
George W. Tressel, and Patricia L. Brown. 25 Mar 75, 64p
Grant NSF-SIS74-10449-A01

Descriptors: *Information systems, Research projects, Economic analysis, Requirements, Cost effectiveness, Reviews, Data acquisition, Technology transfer.

Based on a review of expert opinion and recent literature, this report highlights the critical issues and open questions relating to the economics of the scientific and technical information industry. There is hardly an area that does not call for more and better research -- yet the need is not nearly so much for quantity as for a more coherent and meaningful pattern. Development of such a pattern depends to a large extent upon a body of fundamental information about the field itself. This foundation is simply not available at present. The authors recommend a broad effort to collect available data, together with development of standardized collection methodologies which can meet critical scrutiny as well as provide the necessary additional comparative and additive information. The report further stresses a strong need for increased research and policy study of the roles and processes of information diffusion into the private sector.

PB-245 673/9GA PC$10.25/MF$2.25
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
Water Resources Thesaurus, Second Edition, 1971.
1971, 381p* W76-00059
Supersedes PB-193 056.

Descriptors: *Thesauri, *Water resources, *Subject index terms, Information retrieval, Documentation, Vocabulary, Dictionaries, Classifications, Subject indexing.

This volume is a revision of the Water Resources Thesaurus published in November 1966. The scope of the thesaurus encompasses the broad research areas of water resources such as the hydrologic cycle, supply and demand for water, conservation and the best use of available supplies of water, methods of increasing such supplies, and the economic, legal, social, engineering, recreational, biological, geographical, ecological, and quality aspects of water resources. These research areas are augmented by concepts important in water resources development. Over 7,000 separate changes were made to the hierarchical construction of the Thesaurus to allow for a logical embedded hierarchy of narrow terms for each descriptor. This embedded hierarchy of narrow terms was not present in the 1966 edition. The revised Thesaurus contains an alphabetical list of 4,288 approved main terms interfiled with 1,175 USE references that are intended to lead the user to the right descriptors.

PB-246 191/1GA PC$3.75/MF$2.25
Office of Technology Assessment, Washington, D.C.
Annual Report to the Congress by the Office of Technology Assessment.
Annual rept. no. 1.
15 Mar 74, 40p

Descriptors: *Technology assessment, *Information systems, National government, Organizations, Legislation, Objectives, Personnel, Operations.

This report summarizes the activities of the Office of Technology Assessment from its initial funding in 1973, through March 15, 1974. A legislative history is given as well as a description of the initial assessments to be performed by the Office. The organization is designed to serve as a new effective means for securing competent, unbiased information concerning the physical, biological, economic, social, and political effects of technological applications; and to serve as an aid in the legislative assessment of matters pending before the Congress, particularly where the Federal Government may be called upon to consider support for, or management or regulation of, technological applications.

5C. Economics

AD-A016 495/4GA PC$3.25/MF$2.25
Rand Corp Santa Monica Calif
Technological Exchange Between the United States and Europe: An Attempt in Explaining Shifting Perceptions,
Marc de Brichambaut. Sep 74, 23p Rept no. P-5392

Descriptors: *Technology transfer, Europe, United States, Research management, Marketing, Industries.

The purpose of this paper is to find out whether some of the lessons that can be drawn from the European technology gap of the '60s can be of interest in understanding the present American problem. We shall therefore (1) review the European arguments, (2) try to find out how relevant they have proved to be after a few years, (3) investigate better ways to assess the impact of technological differences, with reference to the current American arguments about technology export, and (4) attempt some conclusions on the policy implications of transferring technology.

COM-75-11371/2GA PC$6.25/MF$2.25
Cook (Paul) Enterprises, Inc., Atlanta, Ga.
Market and Financial Feasibility Study for a Ski and Golf Course Facility, Cherokee, North Carolina.
Technical assistance rept.
Jun 75, 167p EDA-75-04
Contract C-5-36300, Grant EDA-04-06-01202
Prepared in cooperation with Vismor, McGill and Bell, Inc., Columbia, S.C. Sponsored in part by Eastern Band of Cherokee Indians, Cherokee, N.C. Tribal Planning Board.

Descriptors: *Recreational facilities, *Regional planning, *Economic analysis, Marketing, Demand(Economics), Skiing, Economic development, Social effect, American Indians, North Carolina, Economic impact, Environments.
Identifiers: Golf, Cherokee(North Carolina), Recreational complexes.

This report contains findings and recommendations relative to the proposed ski-golf complex at the Bunches Bald-Soco Bald site near Cherokee, North Carolina. It examines in detail all the pertinent factors, including market demands, a competitive analysis, a site examination, environmental considerations, the financial aspects, and the impact of such a project on the Eastern Band of Cherokee Indians.

COM-75-11464/5GA PC$4.25/MF$2.25
National Marine Fisheries Service, Washington, D.C.
Report of the National Marine Fisheries Service for the Calendar Year 1974.
Jul 75, 54p NOAA-75092305

Descriptors: *Fisheries, *Industries, *Economic surveys, Statistical data, Value, Marine fishes, Shellfish, Marketing, Regulations, Organizations, Research, Boats, Documents, Reporting.

This report describes (1) the state of the U.S. fisheries in calendar year 1974, (2) the present organization of the National Marine Fisheries Service (NMFS), and (3) significant developments. It also lists the publications pertinent to its goals and activities during that year. Shrimp was the most valuable commercial fisheries in the country in 1974. The value of fishery products processed in the United States from both domestic and imported raw materials in 1974 is cited.

COM-75-50572-01/GA
PC-GPO/MF$2.25-NTIS
Department of Commerce, Washington, D.C.

Commerce Today. Volume VI, Number 1, October 13, 1975.
13 Oct 75, 44p
Paper copy available from GPO.

Descriptors: *Commerce, Reviews, Operating costs, Taxes, Pensions, Energy, International trade, Expositions.
Identifiers: Tax dollars.

Contents:
Average operating rate in manufacturing unchanged after sharp decline in late 1974 and early 1975;
Newsmemo;
'T-dollars' make huge spending programs intelligible to consumer;
New pension law spells out participants' rights, firms' duties;
States' energy drives beginning to pay off;
Energy management digest;
Domestic business report;
International commerce report.

DIB-75-10-500 PC$10.00/MF$2.25
Domestic and International Business Administration, Washington, D.C.
Survey of the Market for Laboratory Instruments in Brazil, Volume 1.
Foreign market survey rept.
Mar 75, 110p
Report on Brazil includes SIC numbers 3832, 3823, 3693, 3829, 2811, and 9770.

Descriptors: *Market surveys, *Measuring instruments, *Brazil, Exports, Laboratory equipment, Electron microscopes, Spectrometers, X ray apparatus, International trade.

The study was initiated by the Office of International Marketing of the U.S. Department of Commerce to provide an evaluation of the market for selected laboratory instruments in Brazil. The primary objectives of the survey were: To develop a credible overview of the laboratory instrumentation market in Brazil, including an outlook for the market through the year 1979; to identify the market sectors and major forthcoming research and development programs that offer the best opportunities for sales of laboratory instruments.

DIB-75-10-501 PC$10.00/MF$2.25
Ward (Peter) Associates (Interplan) Ltd., London (England).
Markets for Educational and Industrial Training Equipment and Systems in the United Kingdom.
Foreign market survey rept.
Jun 75, 47p
Report on United Kingdom includes SIC numbers 3651, 3861, and 9770. Sponsored in part by Domestic and International Business Administration, Washington, D.C.

Descriptors: *Market surveys, *Training devices, *Great Britain, Exports, Video tapes, Tape recorders, Still projectors.

The total market for educational and industrial training equipment and systems is estimated to be between $45 and $55 million and is growing at an overall rate of about 15 per cent annually. Japan has the largest share of the market with the U.S. in second place. It is improbable that the U.S. will become market leader but they could narrow the gap. The best prospects for growth are in video tape systems and tape recorders linked with slide projectors. In addition transparency making equipment is an attractive growth product. West Germany is at present the third largest exporter to the U.K. of these products and its membership of the EEC will favor this trade (assuming U.K's continued membership) as against Japan and the U.S.A., who are subject to tariff barriers.

DIB-75-10-502 PC$10.00/MF$2.25
Kearney (A. T.) International, Inc., Tokyo (Japan).
The Nuclear Instruments and Accessories Markets in Japan.
Foreign Market survey rept.
25 Aug 75, 139p
Contract S-29-Fa-2266
Report on Japan includes SIC numbers 3823, 3829, 2819, 3443, and 9770. Sponsored in part by Domestic and International Business Administration, Washington, D.C.

Descriptors: *Market surveys, *Radiation measuring instruments, *Japan, International trade, Exports, Nuclear power plants, Fuel reprocessing plants, Nuclear facilities, Nuclear industry.
Identifiers: *Nuclear instrumentation.

The market for nuclear instruments and accessories has grown steadily in Japan during the past decade and has benefited in recent years from the expectation that nuclear power requirements would grow as an offset to the increased cost of producing power from fossile fuels. However, operating problems in existing nuclear plants (only three of eight were operating normally in August, 1975) have resulted in an obvious desire to solve such problems before additional plants are brought into operation. In view of the size and importance of the Japanese market for nuclear instruments and accessories an exhibition at the U.S. Trade Center in Tokyo would appear desirable. Emphasis should be placed on products with advanced technology and particular stress should be placed on nuclear instruments and accessories for use in manufacturing and processing plants.

PB-245 268/8GA PC$4.75/MF$2.25
General Electric Co., Santa Barbara, Calif. TEMPO.
Proposed New Portable Air Compressor Regulation: Supplementary Economic Impact Analysis.
Final rept.,
Plionis McFarland. Jun 75, 79p GE75TMP-33
Contract EPA-68-01-2670

Descriptors: *Economic analysis, *Noise reduction, *Air compressors, *Regulations, Economic impact, Prices, Portable equipment, Industrial relations, Service life, Statistical analysis, Probability theory.
Identifiers: *Noise pollution abatement, Warranties, Tests.

This report is an economic impact analysis relating to the potential economic effects (list price increases) of a portable air compressor regulation. The report supplements a previous economic impact analysis performed by A. T. Kearney for EPA/ONAC. GE-TEMPO assessed the cost and economic impacts of several regulatory options under consideration by EPA/ONAC. The scope of the study included the impacts of a useful life, warranty, and test provisions. The study also attempted to establish the differential impacts of the proposed regulation on the industry.

PB-245 644/0GA PC$4.25/MF$2.25
Denver Urban Observatory, Colo.
A Model Revenue System for the City and County of Denver.
Final rept.,
William O. Winter, and Doyal D. O'Dell. Aug 74, 61p UO-LCCM-DEN-74-018
Contract HUD-H-987

Descriptors: *Local government, *Financial management, *Planning, Revenue, Taxes, Economic models, Assessments, Public utilities, Property taxes, Recommendations, Services, State government, Land titles, Colorado.
Identifiers: *Denver(Colorado), Rebates.

A unique local government revenue model presents ideas for consideration in Denver's long-range fiscal policy planning. It represents a combination of new and old and is a redesign that is politically realistic. It requires major departures from the present system, but the new structure is based mainly upon ownership of property and rate of consumption of public and private goods and services. Among its recommendations are: options for eliminating regressivity of general property tax; a graduated tax on utility consumption; a policy of selected city-owned facilities and utilities making payments in lieu of taxes into the city's General Fund; a system of sales tax rebates related to family incomes; a continuation of the effort to establish a city income tax; and an enlargement of the state's role in financing urban services, particularly welfare and public education.

PB-246 271/1GA PC$8.50/MF$2.25
Stanford Research Inst., Arlington, Va.
The Economic Impact of Energy Shortages on Commercial Air Transportation and Aviation Manufacture. Volume 1. Impact Analysis.
Final rept.,
J. E. Gorham, D. Gross, and J. C. Snipes. Jun 75, 259p FEA/B-75/588
Contract FEA-C-03-50033-00
See also PB-246 272.

Descriptors: *Economic impact, *Energy shortages, *Air transportation, *Aircraft industry, Commercial transportation, Industries, Manufacturing, Prices, Planning.
Identifiers: Energy crisis, Project Independence.

This report evaluates the impact of the energy shortage on commercial air transportation and its related manufacturing industries. As a result, it analyzes the forces of change at work in the air transportation industry relating to the energy crisis, both desirable and undesirable, that are likely to affect the way the industry does business, its efficiency or inefficiency in the use of fuel, the impact of continued fuel price increases, and the ability of the industry to use the most fuel-efficient aircraft presently or prospectively available. The report also seeks to determine the cumulative impact of these factors affecting air transportation on the need for, number of, and timing of requirements for new aircraft in order to assess the secondary impact on the aircraft, engines, and parts manufacturing industries.

PB-246 272/9GA PC$8.75/MF$2.25
Stanford Research Inst., Arlington, Va.
The Economic Impact of Energy Shortages on Commercial Air Transportation and Aviation Manufacture. Volume 2. Aviation Industries Profiles and Energy Usage Characteristics.
Final rept.,
J. E. Gorham, D. Gross, and J. C. Snipes. Jun 75, 284p FEA/B-75/589
Contract FEA-C-03-50033-00
See also PB-246 271.

Descriptors: *Economic impact, *Energy shortages, *Aircraft industry, *Air transportation, Commercial transportation, Industries, Profiles, Fuel consumption.
Identifiers: Energy use, SIC 451, SIC 452, SIC 45, SIC 4511, SIC 4521, Project Independence.

This volume is one of a two part report that summarizes the results of a Stanford Research Institute study on the economic impact of energy shortages on commercial air transportation and aviation manufacture.

5D. History, Law, and Political Science

AD-A016 351/9GA PC$6.25/MF$2.25
Caci Inc Arlington Va Policy Sciences Div

Developing Technology for Analyzing PSYOP Systems (DETAPS): 1972-73 Comparative Event Data Analysis.
Final technical rept.,
Herbert L. Calhoun, Janice B. Fain, Warren R. Phillips, and Herman M. Weil. Nov 74, 172p
Contract DAHC19-74-C-0036

Descriptors: *Political science, *Foreign policy, International relations, Interactions, Factor analysis, Correlation techniques, Decision making, North Vietnam, South Vietnam, China, USSR, United States government, Power, Strategy.
Identifiers: Event interaction analysis.

The study investigates the major influences on North Vietnamese international behavior during the period 1972-73. Results of applying factor analysis and canonical correlation to event data suggest that major power actions by the United States, the Soviet Union, and the People's Republic of China did influence North Vietnam's cooperative actions and negotiations, but had no effect on North Vietnamese hostile behavior. A second approach compares specific U.S. and North Vietnamese initiatives with the subsequent interactions between the two. In the third section, the internal influences on North Vietnamese decision-making are considered. It is concluded that both the rational actor and the bureaucratic politics models are consistent with North Vietnamese behavior during various intervals of the 72-73 time period.

AD-A016 390/7GA PC$5.75/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
Foreign Military Sales Legislation: Impact on the Achievement of United States Foreign Policy Objectives and Its Implication for the Department of Defense.
Master's thesis,
Lynton T. Winn, and James J. Dunlap. Aug 75, 133p Rept no. SLSR-16-75B

Descriptors: *Foreign policy, *Marketing, *Military equipment, Surveys, Legislation, Weapons, Military assistance, Economics, Impact, Department of Defense, International relations, Logistics planning, Theses.
Identifiers: Foreign military sales, Exports.

Foreign military sales (FMS) provide economic benefits to the US and at the same time contribute to the achievement of US foreign policy objectives. Congressional attitudes toward such sales impact the extent to which the objectives of the FMS program are achieved. Specifically, legislative enactments affect the ability of the US to compete against other nations who also are vying for a share of the world's arms market and wish to extend their influence to certain parts of the world. The thesis presents a historical synthesis of legislation related to FMS for the 1961 to June, 1975 time period, together with an assessment of the impact of legislation on the FMS program. The synthesis is accompanied by observations and conclusions concerning the implications for the Department of Defense of recent Congressional activity.

AD-A016 391/5GA PC$5.75/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
United States Foreign Military Sales to Iran: Major Advantages and Disadvantages to Both Countries.
Master's thesis,
Gerald L. Erion, and John L. Harter. Aug 75, 129p Rept no. SLSR-25-75B

Descriptors: *Foreign policy, *Military assistance, *International trade, Logistics planning, Iran, Benefits, Military equipment, Economics, Strategic materials, Forecasting, Security, Surveys, Theses.
Identifiers: Foreign military sales, Disadvantages.

The Security Assistance Program is an integral part of the foreign policy of the United States. In light of the growth of the foreign military sales portion of the Program DOD logistics managers should be able to follow the achievements of the program by an analysis of its results in regard to one country which has shared a legacy of cooperation with the United States. The authors analyze the achievements of the foreign military sales program to Iran from 1965-1975 in terms of what advantages and disadvantages it has provided to both the United States and Iran.

AD-A016 492/1GA PC-GPO
Department of the Army Washington D C
Latin America and the Caribbean: Analytical Survey of Literature, 1974 Edition.
May 75, 800p Rept no. DA-PAM-550-7-1
Updates rept. no. DA-PAM-550-7 dated Feb 69, AD-692 728.
Availability: Paper copy available from GPO.

Descriptors: *Latin America, *Handbooks, *West Indies, Political science, Economics, Sociology, Government(Foreign), International relations, National defense, Argentina, Bahama Islands, Bolivia, Brazil, Chile, Colombia, Barbados, Costa Rica, Ecuador, Guatemala, Nicaragua, El Salvador, Cuba, Dominican Republic, Peru, Panama, Venezuela.
Identifiers: *Area studies, Trinidad and Tobago.

The report deals with Latin America as a whole. It also surveys the regional aspects and presents a country-by-country survey. The abstracts delve into the strategic, military, political, economic, and sociological aspects, both from friendly and unfriendly sources. In selecting the materials from several thousand monographs, books, and periodical articles an attempt was made to present a balanced picture of problems and prospects and of the forces that influence and shape the course of Latin America and of its individual countries. The table of contents is very extensive by design and affords the user a simple tool for locating quickly the desired information.

AD-A016 602/5GA PC$4.75/MF$2.25
Caci Inc-Federal Arlington Va
The Application of New Methodologies to Analyze the Soviet Perceptions of U. S. Policies. Volume I.
Final rept. 19 Nov 74-31 Oct 75,
James R. Brownell, Jr., Teresa Spisak, and Andrew Spisak. 31 Oct 75, 100p
Contract MDA903-75-C0013
See also Volume 2, AD-A016 603.

Descriptors: *Foreign policy, *USSR, International relations, Mass media, Projection, Multivariate analysis, Indicators, National defense.
Identifiers: National security, Event interaction analysis.

The report describes research efforts undertaken to apply advanced quantitative methodologies to the study of Soviet perceptions. This study has developed one analytic technique--a special thematic content analysis-and used another-a particular form of event data analysis--that can provide a wide range of information pertinent to goals and perceptions. It has demonstrated the use of multivariate analysis to link and indicate projections from the information provided by the content and event data analysis techniques. It has demonstrated the further use of such information in bureaucratic analysis approaches. And in the process, it has developed substantive findings of interest in operational planning and in research for national security policy.

AD-A016 603/3GA PC$5.75/MF$2.25
Caci Inc-Federal Arlington Va
The Application of New Methodologies to Analyze the Soviet Perceptions of U. S. Policies. Volume II.
Final rept. 19 Nov 74-31 Oct 75,
James R. Brownell, Jr., Teresa Spisak, and Andrew Spisak.. 31 Oct 75, 135p
Contract MDA903-75-C-0013
See also Volume 1, AD-A016 602.

Descriptors: *Foreign policy, *USSR, Government(Foreign), Communism, Eastern Europe, Western Europe, Middle East, Southeast Asia, Disarmament, Economics, Vulnerability, Power, International relations.
Identifiers: National security, Event interaction analysis.

The report describes research efforts undertaken to apply advanced quantitative methodologies to the study of Soviet perceptions. This study has developed one analytic technique--a special thematic content analysis-and used another-a particular form of event data analysis--that can provide a wide range of information pertinent to goals and perceptions. It has demonstrated the use of multivariate analysis to link and indicate projections from the information provided by the content and event data analysis techniques. It has demonstrated the further use of such information in bureaucratic analysis approaches. And in the process, it has developed substantive findings of interest in operational planning and in research for national security policy.

AD-A016 638/9GA PC$5.75/MF$2.25
Rand Corp Santa Monica Calif
A Biographical Approach to Chinese Political Analysis.
George C. S. Sung. Oct 75, 150p Rept no. R-1665-ARPA
Contract DAHC15-73-C-0181
See also report dated Jun 73, AD-775 355.

Descriptors: *Political science, *China, *Leadership, Military organizations, Power, Predictions, Indicators, Computer programming.
Identifiers: Computer aided analysis.

The study provides a novel methodological basis for a computer-assisted biographic analysis of Chinese leadership. The major analytical tasks undertaken are: (1) To identify salient background variables that affect elite group relationships, (2) to trace the changes in the distribution of power among these elite groups, (3) to attempt to explain these changes in terms of contemporaneous political events, and (4) to explore the validity and predictive value of the methodology. The study has attempted to develop alternative ways of identifying and explaining personnel mobility in the hope that the resulting patterns will help us understand better how China might move from where it is now to where it may be in the future. A major, though still tentative, conclusion of the study is that changes in personnel assignments can indeed be taken as indicators of political turning points and of changes in power relationships at the core.

AD-A016 718/9GA PC$3.25/MF$2.25
National Academy of Sciences Washington D C
Marine Scientific Research and the Third Law of the Sea Conference.
Dec 74, 24p
Contract NSF-C310
A report of the United States National SCOR Committee. Library of Congress Catalog Card No. 74-29083. Sponsored in part by Office of Naval Research, Arlington, Va.

Descriptors: *International law, Continental shelves, Coastal regions, Exploration, Control, Scientific research.
Identifiers: *Law of the Sea, Territorial seas.

This report attempts to assess the U.N. Law of the Sea negotiations as they relate to scientific research activities and to highlight the large scale changes many proposals would require in future marine scientific research activities. The Third U.N. Law of the Sea Conference is analyzed within the context of three committees. The activities of Committee I are centered around issues relating to the international seabed ocean area, i.e., that area of the international ocean seabed and subsoil located beyond areas of coastal state jurisdiction. Committee II deals with issues of particular concern to marine scientific research including those dealing with the territorial sea, the continental shelf, and the economic zone. Committee III deals with marine scientific research and the transfer of technology.

AD-A016 859/1GA PC$3.75/MF$2.25
Army War Coll Strategic Studies Inst Carlisle Barracks Pa
Detente and the Eastern Mediterranean.
Military issues research memo,
Howard L. Chambers. 6 Oct 75, 32p

Descriptors: *Detente, *Mediterranean Sea, *International relations, Threat evaluation, Peacetime, Political science, Economics, Culture, Conflict, Cooperation, USSR, Eastern Europe.
Identifiers: Eastern Mediterranean Region, Ideologies, Balkans.

This memorandum examines the concept of detente and its application to the eastern Mediterranean environment, emphasizing the period since 1961. In addition, it analyzes the implications for detente in the projected environment of the region through 1985. The focus of the memorandum is on the Balkans, to include Turkey, Cyprus, and peripheral areas of the eastern basin.

AD-A016 860/9GA PC$3.25/MF$2.25
Army War Coll Strategic Studies Inst Carlisle Barracks Pa
Terrorism and the Military Response.
Military issues research memo,
Kenneth E. Roberts. 14 Oct 75, 23p

Descriptors: *Terrorism, Definitions, Threat evaluation, Countermeasures, Classification, Military strategy, United States, International relations, Limitations, Mission profiles.
Identifiers: Recommendations.

This research memorandum discusses the terrorist threat to the United States, with emphasis on the fact that the US military has increasingly been a target of terrorist activity. Situations which may require the use of US military force are considered, and the specific problems and legal limitations of a military response are analyzed. Finally, recommendations are made regarding how the military services can better contribute to the fight against international terrorism.

AD-A016 869/0GA PC$3.75/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
Standard Scenarios for the Less-Lethal Weapons Evaluation Model.
Final rept. Mar 74-Mar 75,
Donald O. Egner, and Larry W. Williams. Aug 75, 42p Rept no. HEL-TM-20-75

Descriptors: *Law enforcement, *Weapons, Weapons effects, Lethality, Riot control, Prisoners, Prisons, Police, Behavioral science, Incapacitation.
Identifiers: *Nonlethal weapons, Scenarios.

This report presents work done in developing standard scenarios of law-enforcement situations for utilization in a previously developed model for the evaluation of less-lethal weapons. Particular emphasis in this report is on prison-type scenarios. This work was performed for the Law Enforcement Assistance Administration, Department of Justice. (Author)

AD-A016 884/9GA PC$3.25/MF$2.25
Army War Coll Strategic Studies Inst Carlisle Barracks Pa
The Prospects of Soviet-American Alliance.
Research memo.,
Lewis S. Sorley. 30 Sep 75, 25p

Descriptors: *Foreign policy, *International relations, *United States Government, *USSR, Government(Foreign), Treaties, Geopolitics, Economics, Nuclear weapons, Benefits, Political science, Feasibility studies.
Identifiers: Alliances.

This memorandum observes that many changes which bear on the utility and viability of alliances have taken place in the last quarter century, including an explosion of national entities, recovery of the economies of nations devastated by the war, population growth, nuclear proliferation, decline of ideologies, increased competition for resources, the demise of colonial empires, and the practical failure of international organizations. These factors indicate a reevaluation and possible restructuring of existing alliances will be forthcoming. How the relationships between the Unitd States and Soviet Union might be affected is considered, as well as possible joint actions by the superpowers to influence the behavior of other nations. (Author)

AD-A016 979/7GA PC$4.25/MF$2.25
Michigan Univ Ann Arbor Dept of Political Science
The Policy Relevance of Models in World Politics.
Research rept.,
Raymond Tanter. Oct 71, 55p Rept no. RR-7
Contract N00014-67-A-0181-0042, ARPA Order-1411

Descriptors: *Political science, *International relations, *Model theory, Policies, Models, Control theory, Confidence level, Game theory, Surveys, Man machine systems, Simulation, Information systems, Effectiveness, Assessment.
Identifiers: *International politics.

This paper evaluates the policy relevance of models according to two criteria: (1) the degree to which policy makers may perceive they have control over predictors in the model; and (2) the degree of confidence policy makers may have in the model's implications. An evaluation is made of various models applicable in world politics from the perspective of their policy relevance. These include: game theory models and experimental games, man-machine simulation models, aggregate data models, and computer simulation models and information systems.

AD-A016 987/0GA PC$3.75/MF$2.25
Michigan Univ Ann Arbor Dept of Political Science
World Handbook of Political and Social Indicators II. Section V. Raw Data File: Fractionalization and Concentration Measures and Inequality Indices.
Research rept.,
Charles Lewis Taylor, and Michael C. Hudson. 1970, 26p Rept no. RR-9
Contract N00014-67-A-0181-0026, ARPA Order-1411
See also AD-A016 989. Prepared in cooperation with Yale Univ., New Haven, Conn.

Descriptors: *Political science, *Sociometrics, *Data banks, Foreign, Coding, Indexes, Statistical data, Variables, Demography, Population, United Nations, Handbooks.
Identifiers: Political indicators, Social indicators, Foreign countries.

The World Handbook data collection consists of one file of aggregate data for variables such as politics, economics and education; two files with raw data used in the aggregate data file for construction of inequality indices and fractionalization scores; three files of data for a political event series of eighteen events; and several special computer programs. This data set contains raw data for nine variables.

AD-A016 988/8GA PC$3.25/MF$2.25
Michigan Univ Ann Arbor Dept of Political Science
The International Data Archive: Data Holdings.
Research rept.,
Raymond Tanter. Sep 71, 20p Rept no. RR-6
Contract N00014-67-A-0181-0026, ARPA Order-1411

Descriptors: *International relations, *Data banks, Classification, Foreign, Organizations, Conflict, Instructional materials, Systems analysis.
Identifiers: Political events.

The Archive's data holdings are grouped into five categories: cross-national data, event data, data on conflicts, international organization data, and instructional packages. Cross-national data sets include those which have the nation as the unit of analysis. Event data are those studies which use the event as the unit of analysis. The conflict category takes cases of conflict as the unit of analysis. The international organization category contains studies on international organizations and studies that use the international system approach as the level of analysis. The instructional package category contains special studies designed to aid in the teaching of international affairs.

AD-A016 989/6GA PC$9.50/MF$2.25
Michigan Univ Ann Arbor Dept of Political Science
World Handbook of Political and Social Indicators II. Section I. Cross-National Aggregate Data.
Research rept.,
Charles Lewis Taylor, and Michael C. Hudson. 1970, 338p Rept no. RR-8
Contract N00014-67-A-0181-0026, ARPA Order-1411
See also AD-A016 987. Prepared in cooperation with Yale Univ., New Haven, Conn.

Descriptors: *Political science, *Sociometrics, *Data banks, Information systems, Handbooks, Demography, Economics, Coding, Statistical data, Surveys.
Identifiers: Political indicators, Social indicators, Foreign countries.

The document contains a listing of nations of the world with their assigned Archive code numbers, followed by data on several variables studied. These include population, agricultural area, vital statistics, life expectancy, telephones, lettermail, mass media, literacy, educational enrollments, steel and energy consumption, land data, occupations, political activity, assistance, gross national product, and other facets of national economy.

AD-A016 990/4GA PC$6.25/MF$2.25
Michigan Univ Ann Arbor
International Data Archive.
Technical progress rept. no. 4, 1 Jan-30 Jun 71. 1971, 167p
Contract N00014-67-A-0181-0026, ARPA Order-1411
See also AD-723 208.

Descriptors: *International relations, *Data banks, Data acquisition, Data processing, Distribution, Information systems, Computer programming, Political science, Sociometrics, Military planning, United Nations, Interactions.
Identifiers: Political events.

The Archive undertakes as its primary goals the acquisition, standardization, and dissemination of international affairs data. These goals necessitate adequate standards, predominatly in the areas of data formatting, definitions and coding of variables, and validity checking of data. The first document is a list of studies available from the Archive as of 30 Jun 1971. The second is an index of all variables in Archive holdings. The third document is a description of the OSIRIS-CONSTAT Interface program. The fourth through eighth documents are the final versions of Archive produced codebooks for political events and interactions.

AD-A016 996/1GA PC$4.75/MF$2.25
Army War Coll Carlisle Barracks Pa
US-Thai Security Cooperation in a Changing Security Environment.
Group research project,
Edward F. Clarke, James A. Heiter, Franklin O. Mikle, and Donald E. Weatherbee. 5 Sep 75, 88p

Descriptors: *International relations, *Security, *Southeast Asia, United States, Interactions, Political science, Thailand, Military assistance, Planning, Cooperation.

In the context of the changed political and international security environment in Southeast Asia, the quarter-century Thai-American security link no longer seems viable. As the US reduces its presence in Thailand to levels commensurate with major interests as opposed to vital, it will be important to secure some residual level of US military assistance to Thailand in order for the Thais to maintain what capabilities they have to combat domestic insurgency and act independently in foreign policy.

AD-A016 997/9GA PC$4.75/MF$2.25
Army War Coll Carlisle Barracks Pa
U.S. Indian Ocean Policy.
Group research project,
George M. Johnson, Bobby G. Christy, and Vernon C. Smith. 9 Jun 75, 92p

Descriptors: *International relations, *Indian Ocean, *Foreign policy, United States government, Oil fields, Middle East, Access, Military operations, Strategy.
Identifiers: Indian Ocean Region, Recommendations, Diplomacy.

The United States has national interests in the Indian Ocean region, and this paper recommends a US Government policy and a mid-range military strategy to support these interests. The interests of the littoral and major non-littoral nations are identified and examined. Alternative US policies and strategies are developed and evaluated. It is concluded that the primary interests of the United States in the region are to insure that the United States and its allies have access to Mideast oil, that the concept of 'Freedom of the Seas' is maintained, and that no unfriendly nation be allowed to become dominant in the region. The paper recommends that the United States place primary emphasis on diplomacy, and on economic and technical assistance to achieve US objectives.

COM-75-50602/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Apply Statistics in Criminalistics.
Final rept.,
James A. Lechner. Aug 74, 11p
Sponsored in part by National Inst. of Law Enforcement and Criminal Justice, Washington, D.C.
Pub. in Paper on Proceedings of Carnahan and International Crime Countermeasures Conference (1974), UKY Bulletin 105 p113-123 Aug 74.

Descriptors: *Criminal investigations, *Statistical analysis, Confidence limits, Trace elements.
Identifiers: Reprints, Goodness of fit tests, Breath alcohol analysis, Forensic chemistry.

This paper is intended to tell 'why-we-do-it-this-way'. After preliminary remarks on randomness, errors, and distribution functions, various techniques of statistical analysis are discussed. These include significance tests, confidence intervals, and goodness of fit tests. Finally, several examples are discussed: (1) Performance requirements for breath alcohol testers; (2) bivariate discrimination for gunshot residue detection; and (3) matching 'profiles', e.g., trace element analyses or the output of a speech frequency analyzer.

PB-244 209/GA 16mm microfilm $90.00
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. I. Survey of USSR Broadcasts.
1975,9 16mm microfilm reels or cartridges
Individual reels available for $10.00; individual cartridges (specify type) available for $10.00.
Available in set of 9 16mm microfilm reels or cartridges (specify type): reel, PB-244 209-P, $90.00; 3M cartridge, PB-244 209-M, $90.00; Recordak cartridge, PB-244 209-R, $90.00; or Thread Easy Magazine, PB-244 209-T, $90.00.

The reports survey and analyze USSR broadcasts from 22 April 1947 - 19 June 1958. They cover communist media treatment of such topics as Soviet-U.S. relations, nuclear issues and arms limitation, security, international communist alignments and Soviet general foreign relations and domestic affairs. For individual reports, see below:
- Reel 1, Survey of USSR Broadcast, 22 April 1947-30 January 1948. 1 reel, $10.00, or cartridge (specify) **PB-244 209-1/GA**
- Reel 2, Survey of USSR Broadcast, 6 February 1948-14 May 1948. 1 reel, $10.00, or cartridge (specify) **PB-244 209-2/GA**
- Reel 3, Survey of USSR Broadcast, 21 May 1948 - 10 December 1948. 1 reel, $10.00, or cartridge (specify) **PB-244 209-3/GA**
- Reel 4, Survey of USSR Broadcast, 17 December 1948 - 30 June 1949. 1 reel, $10.00 or cartridge (specify) **PB-244 209-4/GA**
- Reel 5, Survey of USSR Broadcast, 7 July 1949 - 16 February 1950. 1 reel, $10.00, or cartridge (specify) **PB-244 209-5/GA**
- Reel 6, Survey of USSR Broadcast, 23 February 1950 - 4 October 1951. 1 reel, $10.00, or cartridge (specify) **PB-244 209-6/GA**
- Reel 7, Survey of USSR Broadcast, 18 October 1951 - 23 December 1954. 1 reel, $10.00, or cartridge (specify) **PB-244 209-7/GA**
- Reel 8, Survey of USSR Broadcast, 6 January 1955 - 19 June 1958. 1 reel, $10.00, or cartridge (specify) **PB-244 209-8/GA**
- Reel 9, Survey of USSR Broadcast, Tables of contents 22 April 1947 - 19 June 1958. 1 reel, $10.00, or cartridge (specify) **PB-244 209-9/GA**

PB-244 210/GA 16mm microfilm $30.00
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. II. Survey of Far East Broadcasts.
1975,3 16mm microfilm reels or cartridges
Individual reels available for $10.00; individual cartridges (specify type) available for $10.00.
Available in set of 3 16mm microfilm reels or cartridges (specify type): reel, PB-244 210-P, $30.00; 3M cartridge, PB-244 210-M, $30.00; Recordak cartridge, PB-244 210-R, $30.00; or Thread Easy Magazine, PB-244 210-T, $30.00.

The reports survey Far East broadcasts from 12 October 1950 - 26 June 1958. They cover communist media treatment of such topics as nuclear issues and arms limitation, security, international communist alignments and Far East general foreign relations and domestic affairs. For individual reports, see below:
- Reel 1, Survey of Far East Broadcasts, 12 October 1950 - 30 December 1955. 1 reel, $10.00, or cartridge (specify) **PB-244 210-1/GA**
- Reel 2, Survey of Far East Broadcasts, 12 January 1956 - 26 June 1958. 1 reel, $10.00, or cartridge (specify) **PB-244 210-2/GA**
- Reel 3, Survey of Far East Broadcasts, Tables of Contents 12 October 1950 - 26 June 1958. 1 reel, $10.00, or cartridge (specify) **PB-244 210-3/GA**

PB-244 213/GA 16mm microfilm $30.00
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. V. Trends and Highlights of Communist Bloc Broadcasts.
1975,3 16mm microfilm reels or cartridges
Individual reels available for $10.00; individual cartridges (specify type) available for $10.00.
Available in set of 3 16mm microfilm reels or cartridges (specify type): reel, PB-244 213-P, $30.00; 3M cartridge, PB-244 213-M, $30.00; Recordak cartridge, PB-244 213-R, $30.00; or Thread Easy Magazine, PB-244 213-T, $30.00.

The reports give trends and highlights of Communist Bloc broadcasts from 25 June 1958 - 29 March 1967. They cover communist media treatment of such topics as nuclear issues and arms limitation, security, international communist alignments and Communist Bloc general foreign relations and domestic affairs. For individual reports, see below:
- Reel 1, Trends and Highlights of Communist Bloc Broadcasts, 25 June 1958 - 30 June 1965. 1 reel, $10.00, or cartridge (specify) **PB-244 213-1/GA**
- Reel 2, Trends and Highlights of Communist Bloc Broadcasts, 8 July 1965 - 29 December 1966. 1 reel, $10.00, or cartridge (specify) **PB-244 213-2/GA**
- Reel 3, Trends and Highlights of Communist Bloc Broadcasts, 1 January 1967 - 29 March 1967. 1 reel, $10.00, or cartridge (specify) **PB-244 213-3/GA**

PB-244 214/GA 16mm microfilm $80.00
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VI. Survey of Communist Bloc Broadcasts.
1975,8 16mm microfilm reels or cartridges
Individual reels available for $10.00; individual cartridges (specify type) available for $10.00.
Available 80 set of 8 16mm microfilm reels or cartridges (specify type): reel, PB-244 214-P, $80.00; 3M cartridge, PB-244 214-M, $80.00; Recordak cartridge, PB-244 214-R, $80.00; or Thread Easy Magazine, PB-244 214-T, $80.00.

The reports survey Communist Bloc broadcasts from 3 July 1958 - 20 March 1967. They cover communist media treatment of such topics as nuclear issues and arms limitation, security, international communist alignments and Communist Bloc general foreign relations and domestic affairs. For individual reports, see below:
- Reel 1, Survey of Communist Bloc Broadcasts, 3 July 1958 - 30 June 1960. 1 reel, $10.00, or cartridge (specify) **PB-244 214-1/GA**

Reel 2, Survey of Communist Bloc Broadcasts, 14 July 1960 - 28 December 1962. 1 reel, $10.00, or cartridge (specify) **PB-244 214-2/GA**
Reel 3, Survey of Communist Bloc Broadcasts, 10 January 1963 - 27 December 1963. 1 reel, $10.00, or cartridge (specify) **PB-244 214-3/GA**
Reel 4, Survey of Communist Bloc Broadcasts, 9 January 1964 - 24 December 1964. 1 reel, $10.00, or cartridge (specify) **PB-244 214-4/GA**
Reel 5, Survey of Communist Bloc Broadcasts, 7 January 1965 - 23 December 1965. 1 reel, $10.00, or cartridge (specify) **PB-244 214-5/GA**
Reel 6, Survey of Communist Bloc Broadcasting, 6 January 1966 - 22 December 1966. 1 reel $10.00, or cartridge (specify) **PB-244 214-6/GA**
Reel 7, Survey of Communist Bloc Broadcasts, 23 December 1966 - 20 March 1967. 1 reel, $10.00, or cartridge (specify) **PB-244 214-7/GA**
Reel 8, Survey of Communist Bloc Broadcasts, Tables of Contents 3 July 1958 - 20 March 1967. 1 reel $10.00 or cartridge (specify) **PB-244 214-8/GA**

PB-244 228/3GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VII. Survey of Communist Propaganda, 13 April 1967 through December 1967.
1975, 20 sheets
Microfiche available on subscription only $30.00/year domestic, $40.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 229/1GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VII. Survey of Communist Propaganda, January 1968 through December 1968.
1975, 27 sheets
Microfiche available on subscription only $40.00/year domestic, $50.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 230/9GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VII. Survey of Communist Propaganda, January 1969 through 23 April 1970.
1975, 38 sheets
Microfiche available on subscription only $50.00/year domestic, $60.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 231/7GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. 5 April 1967 through December 1967.
1975, 39 sheets
Microfiche available on subscription only $30.00/year domestic, $40.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 232/5GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. January 1968 through December 1968.
1975, 53 sheets
Microfiche available on subscription only $40.00/year domestic, $50.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 233/3GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. January 1969 through December 1969.
1975, 54 sheets
Microfiche available on subscription only $40.00/year domestic, $50.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 234/1GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. January 1970 through December 1970.
1975, 60 sheets
Microfiche available on subscription only $40.00/year domestic, $50.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 235/8GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. January 1971 through December 1971.
1975, 54 sheets
Microfiche available on subscription only $40.00/year domestic, $50.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 236/6GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. January 1972 through December 1972.
1975, 52 sheets
Microfiche available on subscription only $40.00/year domestic, $50.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 237/4GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. January 1973 through December 1973.
1975, 55 sheets
Microfiche available on subscription only $40.00/year domestic, $50.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-244 238/2GA MF-Subscription
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. January 1974 through December 1974.
1975, 55 sheets
Microfiche available on subscription only $40.00/year domestic, $50.00/year foreign.

Descriptors: *Radio broadcasting, *Mass media, Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

PB-245 640/8GA PC$125.00/MF$40.00
Foreign Broadcast Information Service, Washington, D.C.
Trends in Communist Media. VIII. January 1975 - December 1975.
1975, 52 issues
Also available in single copies PC$4.00, MF$2.25.

Descriptors: *Radio broadcasting, *Mass media, *Propaganda, Communism, Mass communication, International relations, Foreign policy, Arms control.

The report analyzes communist media discussions of key issues in international events and other policy affairs.

5E. Human Factors Engineering

AD-A016 418/6GA PC$3.25/MF$2.25
Systems Research Labs Inc Dayton Ohio
Design Option Decision Tree: A Method for Systematic Analysis of Design Problems and Integration of Human Factors Data.
Professional paper,
William B. Ackren, and Kenneth D. Korkan. Jul 75, 20p AFHRL-TR-75-9

Contracts F33615-70-C-1440, F33615-73-C-4044
Paper presented at the Annual Meeting of the Human Factors Society (18th), Huntsville, Ala. 15-17 Oct 74.

Descriptors: *Human factors engineering, *Aircraft maintenance, Maintenance personnel, Aeronautical engineering, Trade off analyses, Decision making, Systems analysis, Jet engines, Military aircraft, Air Force training, Skills.
Identifiers: Design option decision trees, DODT(Design Option Decision Trees), Decision trees, Troubleshooting.

A graphical format termed the Design Option Decision Tree (DODT) is described. The DODT displays the various design options available at each decision point in the design process. Several examples of DODTs for aircraft design problems are illustrated. The procedures for developing a DODT are described. A proposed method for use of the DODT to resolve a design problem is presented. This method includes evaluating the design options in the Tree for impact on the system, and tracing paths through the Tree as dictated by specific design goals. The use of human factors data as one of the evaluation parameters is described. The paper concludes with a discussion of other uses of a DODT. (Author)

AD-A016 419/4GA PC$3.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Annotated Bibliography of the Advanced Systems Division Reports (1973 - 1974).
Interim rept. Mar 73-Dec 74,
Helen E. Lebkisher. Aug 75, 39p Rept no. AFHRL-TR-75-12
Supplement to Rept. no. AFHRL-TR-72-43 dated Mar 73, AD-760 114.

Descriptors: *Human factors engineering, *Bibliographies, Air Force training, Teaching methods, Training devices, Simulation, Psychology, Performance(Human), Assessment, Human resources.

This document is an annotated bibliography of technical reports and other publications on research conducted by the Advanced Systems Division, Air Force Human Resources Laboratory (AFHRL). The cited references cover the period March 1973 through December 1974. Also included are references of reports published prior to March 1973 which were approved for public release during this period.

AD-A016 790/8GA PC$4.25/MF$2.25
Army Materiel Command Texarkana Tex Intern Training Center
Visual Performance under Monochromatic Illumination and Scotopic Vision Conditions.
Final rept.,
John G. Delgado. Jun 75, 57p Rept no. USAMC-ITC-02-08-75-113

Descriptors: *Visual perception, *Monochromatic light, *Human factors engineering, Military operations, Night vision, Illumination.
Identifiers: Scotopic vision.

The objective of this report was to investigate the effect of different colors of illumination on visual performance. The experiment was conducted in a dark room in order to simulate nighttime conditions. Three colors of illumination were selected and the visual performance of ten subjects was examined at three illumination intensity levels. The three colors selected for testing were red, blue, and amber. Task scores, obtained from a manipulative dexterity task, were used to evaluate visual performance. A three-factor, randomized block design model was used to analyze the data of the experiment. The color of illumination, for a manipulative dexterity task, was found to have no significant effect on visual performance at a 5 percent level of significance.

COM-75-11465/2GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C. Human Factors Section.
An Evaluation of a Range-Top Warning Light System.
Final rept.,
Mary E. Stefl, and J. J. Persensky. Jul 75, 22p NBSIR-75-797
Sponsored in part by Consumer Product Safety Commission, Washington, D.C.

Descriptors: *Electric stoves, *Warning systems, Accident prevention, Burns(Injuries), Experimental data, Tests, Humans, Human factors engineering, Factor analysis, Electric lamps, Intensity, Background, Position(Location).
Identifiers: Consumer protection.

A descriptive analysis of in-depth injury investigations of range-related accidents revealed a series of incidents where range-users were unaware that surface elements were energized. One proposed solution to this problem involved a system of four warning lights to indicate individual surface unit activation. A laboratory study using human subjects evaluated the effectiveness of such a system. The backgrounds against which the warning lights were fitted and the intensity of the lights were examined for influence on subjects' responses in a reaction time task. The position of the lights and the type of ancilliary task being performed by the subject appeared important. The results are discussed in terms of product design and safety, and implications of the study for methodological development are considered.

COM-75-50656/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Some Measurement Engineering Innovations in Consumer Products.
Final rept.,
Louis A. Marzetta. 1975, 4p
Pub. in Proceedings of Joint Measurement Conference, Gaithersburg, Md., 12-14 Nov 74, p41-44 1975.

Descriptors: *Electric appliances, *Human factors engineering, *Safety engineering, Test equipment, Burns(Injuries), Simulators, Surface temperature, Responses, Skin(Anatomy).
Identifiers: *Consumer protection, Hazard reduction.

Exploration of the problem concerning hazards in consumer products has shown that laboratory engineers can usefully apply basic measurement practices towards improving safety and developing new measuring tools. Some novel and relatively simple redesign features will be presented concerning a common household appliance that can significantly reduce its electrical and thermal hazards. Included in the paper are details of an instrument which tests for burn hazard by simulating the human response to contact with a hot surface.

NTIS/PS-75/791/4GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Signs and Display Systems: Graphic Design and Human Engineering (A Bibliography with Abstracts).
Rept. for 1964-Nov 75,
Carolyn Shonyo. Oct 75, 112p*
Supersedes NTIS/PS-75/073.

Descriptors: *Bibliographies, *Display systems, *Highway signs, Symbols, Human factors engineering, Graphic arts, Visibility, Transportation, Instrument panels.
Identifiers: Signs.

The bibliography contains annotated references to research reports covering varied aspects of design of signs and displays, particularly in the transportation field. Specific topics include: Highway sign design; highway sign legibility; traffic control devices; transportation graphics; visual perception of aircraft instrument display systems; human engineering of symbols; and legibility of maps. (Contains 107 abstracts)

5G. Linguistics

AD-A016 701/5GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
The CASPERS Linguistic Analysis System.
Journal article,
John W. Klovstad, and Lee F. Mondshein. 29 Mar 74, 8p Rept no. MS-3727 ESD-TR-75-264
Contract F19628-73-C-0002, ARPA Order-512
Availability: Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, vASSP-23 n1 p118-123 Feb 75.

Descriptors: *Computational linguistics, *Computer programs, *Speech recognition, *Acoustic signals, *Signal processing, Machine translation, Automation, Symbols, Transformations, Syntax, Memory devices, Word organized storage, Linguistics, Dictionaries, Reprints.
Identifiers: CASPERS(Computer automated speech perception system), Computer automated speech perception, Acoustic lexical interface, Context free grammar.

CASPERS (Computer-Automated Speech Perception System) is a user-modifiable facility for translating strings of acoustic symbols into sentences. Three distinctive aspects of the system's design will be discussed: the dynamic application of acoustic-phonological rules across word boundaries, an acoustic-unit splitting-and merging strategy for treating the dictionary matching problem, and an extensive capability for handling semantic routines within an augmented context-free grammar. (Author)

5H. Man-Machine Relations

AD-A016 838/5GA PC$3.75/MF$2.25
Wisconsin Univ Madison Dept of Industrial Engineering
Visual Dynamics When Interrupting a Control Task to Search for a Peripheral Target.
Technical rept.,
Gordon H. Robinson, and Jeffrey R. Bond. 15 Oct 75, 31p Rept no. TR-75-21
Contract N00014-75-C-0364

Descriptors: *Visual surveillance, *Man machine systems, *Eye movements, Control, Operators(Personnel), Performance(Human), Visual perception, Human factors engineering, Tracking, Psychophysiology.
Identifiers: Saccadic eye movements.

The dynamic patterns of eye and head movements were measured when the subject interrupted a manual control task to visually process a peripheral, digital target. The initial pattern of movement differs both quantitatively and qualitatively from that reported in 'classic' studies without the competing, central, ongoing task. A compensatory eye/head movement period was observed wherein the head began movement toward the target while fixation remained on the control task display. The initial saccadic eye movement was delayed approximately 300 msec over the classic paradigm. Control order (plant dynamics) and control signal bandwidth have effects on this pattern as does the status of control at the time search is commanded.

JPRS-65773 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Engineering Psychology in the Development of Automated Control Systems,
V. Venda. 26 Sep 75, 17p
Trans. of Sotsialisticheskii Trud (USSR) n4 p71-82 1975.

Descriptors: *Man machine systems, *Automatic control equipment, *Engineering psychology, Human factors engineering, Industrial psychology, USSR, Translations.

The report contains a discussion of problems relating to man-machine systems as a constituent part of engineering psychology in the development of automated control systems.

5I. Personnel Selection, Training, and Evaluation

AD-A016 336/0GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
An Analysis of Response Distributions from Three Different Etiological Groups of Educationally Handicapped Learners.
Master's thesis,
Wolfgang W. Oertel. Sep 75, 63p

Descriptors: *Learning, *Children, *Handicapped persons, Teaching methods, Etiology, Behavior, Mental disorders, Rehabilitation, Group dynamics, Individualized training, Theses.

In the area of special education there are two different approaches towards training: The differential diagnosis approach states that etiological characteristics affect prognosis for training and the behavioral approach asserts that the results of training are independent of etiological factors. To obtain more evidence regarding these positions, the response distributions of three groups of language-handicapped children with different etiologies were analyzed using the Markovian learning model as a tool. The learning task was a remedial language program created by the Behavioral Sciences Institute, Carmel, California.

AD-A016 340/2GA PC$4.75/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
History and Evaluation of the Integrated Avionic Systems Specialty.
Master's thesis,
Murice C. Green, and Lloyd M. Mozingo. Aug 75, 95p Rept no. SLSR-29-75B

Descriptors: *Maintenance personnel, *Integrated systems, *Training, *Avionics, Microelectronics, Test equipment, Automatic, Air Force personnel, Requirements, Theses.

The thesis presents a historical analysis of the Integrated Avionic Systems Specialty (326XX). It reviews the results of many developments in weapons technology which have affected Air Force Maintenance concepts and training requirements. Research efforts were directed at integrated avionic systems which have evolved from microelectronics technology. Since 1968, additional weapon systems have been added to the Air Force inventory and the resulting overextension of this career field caused manpower and training problems. After several years of intercommand deliberation, corrective changes to this career specialty have recently been proposed. Restructing of the 326XX AFSC is expected to provide improved manpower skills for the maintenance of the F/FB-111, A-7D, F-15, F-16, andB-1 aircraft. Future developments in technology or changes in maintenance policy may require further evaluation of this career field structuring and logistic support requirements.

AD-A016 354/3GA PC$3.75/MF$2.25
Electronic Systems Div Hanscom AFB Mass
Automated Fradulent Enlistment Detection System. A Study of the Fradulent Enlistment Problem.
Final rept.,
Robert G. Bergdoll, and Charles J. Denny. 15 Oct 75, 40p Rept no. ESD-TR-75-99

Descriptors: *Enlisted personnel, *Deception, Recruiting, Rejection, Information systems, Automatic, Data processing.
Identifiers: *Fraud.

In recent years, increases in military pay compensation and benefits have made the Armed Forces a lucrative job opportunity for individuals of enlistment age. Some individuals, who are found to be unfit for military service at one Armed Forces Examining and Entrance Station (AFEES), go to another AFEES and attempt to enlist in the Armed Forces by concealing the source of their previous disqualification; these individuals are referred to as fraudulent enlistees. This study proposes the development and implementation of an automated detection system, referred to as the Automated FED system, to resolve this problem. The Automated FED system consists of a centralized, tape-based computer system located at Hq USAREC which is linked to each AFEES by remote communication terminals. The system has been designed to incorporate the existing hardware and operational procedures of USAREC's AFEES Reporting System (ARS), and provides each AFEES with the capability to query a data base located at Hq USAREC so that fraudulent enlistees may be detected and their processing terminated. The data base consists of records for all applicants processed in the AFEES system within the previous year but not enlisted. The data records contain only that information required to sufficiently identify the fraudulent enlistee and disqualification reason(s).

AD-A016 417/8GA PC$3.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Self-Perceived Problems of Student Pilots Eliminated from Undergraduate Pilot Training.
Interim rept. Apr 73-Apr 74,
Edward E. Eddowes, and Norman W. King. Jul 75, 29p Rept no. AFHRL-TR-75-8

Descriptors: *Flight training, *Perception(Psychology), Pilots, Deficiencies, Human factors engineering, Students, Attrition, Factor analysis, Anxiety, Questionnaires, Interviewing, Elimination, Learning, Instructors, Interpersonal relations, Personnel selection, Air Force training, Optimization, Cost effectiveness, Air Force personnel.
Identifiers: Undergraduate pilot training.

This report describes how students eliminated from undergraduate pilot training (UPT) perceived the circumstances leading to their elimination. The objectives of the study were: increased understanding of factors associated with UPT attrition and delineation of prime areas for training research. Personal interviews with 117 eliminees provided information on the similiarities and differences among five categories of attrition (self-initiated elimination (SIE); manifestation of apprehension (MOA); flying deficiency (FD); medical deficiency (MD) and academic deficiency (ACAD). While major problem areas were identified related to learning how to land the aircraft and with student-instructor pilot interactions, inability to acquire pilot skills is not as important a basis for elimination from UPT as are other categories of elimination, such as SIE and MOA, both of which are associated with a variety of psychological attributes. It was concluded that eliminees perceptions of training problem areas can provide useful information for training program and can suggest areas for training research. (Author)

AD-A016 420/2GA PC$3.25/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Criterion Referenced Measures of Technical Proficiency in Maintenance Activities.
Final rept.,
John P. Foley, Jr. Oct 75, 11p Rept no. AFHRL-TR-75-61
Paper presented at Annual Meeting of the Human Factors Society, Bedford, Tex., 14--16 Oct 75.

Descriptors: *Performance tests, *Work measurement, *Maintenance personnel, Validation, Human factors engineering, Test construction(Psychology), Proficiency, Standards, Reliability, Aircraft maintenance, Effectiveness, Job analysis, Checkout procedures, Performance(Human), Symbols, Graphics, Personnel selection, Maintenance management, Job training.
Identifiers: Troubleshooting.

This paper concerns instruments used to determine how efficiently maintenance men perform the various tasks of their jobs. Currently, a great deal of reliance is placed on unvalidated knowledge tests, theory tests, school marks, and supervisor's ratings. The limitations of tradiational systems effectiveness measures are discussed. Although job task performance tests (JTPT) have higher empirical validity, such tests have had very limited use because of their relatively high cost in time, personnel and equipment. Consequently this laboratory has supported studies to develop better criterion referenced JTPT, and to develop paper and pencil symbolic substitute tests of high empirical validity. The paper describes the model battery of 48 criterion referenced JTPT, which has been developed to cover all key maintenance activities such as checkout, align/adjust, remove/replace, troubleshooting, test equipment and soldering. Many factors were considered including the identification and classification of tasks to be measured, the hierarchal relationship of maintenance tasks, the most effective order of their measurement and the ease of test administration. This battery was developed as a model of JTPT to be used on the job and in training. It was also intended as a battery of criterion tests for the validation of paper and pencil symbolic substitute tests. Batteries of graphic and video symbolic substitute tests were developed and given limited validations. The validation of graphic symbolic substitute tests indicated that the symbolics for all activities with the exception of soldering, have promise. An unsuccessful effort to develop video symbolic substitute tests is also mentioned.

AD-A016 440/0GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
Manpower Planning Models - III. Longitudinal Models.
Technical rept.,
R. C. Grinold, and K. T. Marshall. Aug 75, 90p Rept no. NPS-55Mt75081
See also report dated Mar 75, AD-A009 926.

Descriptors: *Manpower utilization, *Statistical analysis, Mathematical models, Formulations, Theory, Planning, Forecasting, Universities, Instructors, Students, Military personnel, Flow, Retirement(Personnel).
Identifiers: *Manpower planning models.

This is the third in a series of reports on manpower planning models. The emphasis in this report is on the formulation, theory, and application of longitudinal models. The concepts of chain flows are introduced and exploited in a number of applications.

AD-A016 479/8GA PC$7.50/MF$2.25
George Washington Univ Alexandria Va Human Resources Research Office

Crew Duties and Tasks for Maintenance of the M551,
R. E. Kraemer. Jul 68, 231p
Contract DA-44-188-ARO-2

Descriptors: *Crews, *Tanks(Combat vehicles), Job analysis, Training, Maintenance, Operators(Personnel), Manuals.
Identifiers: M-551 vehicles.

The document provides job task descriptions for crew maintenance of the M551 vehicle, and describes the sequence of task elements necessary in performing each task. It collates and delineates all vehicle-related tasks required in maintenance by the vehicle crew. The material will serve as a partial basis for research analyzing forthcoming training requirements for the Main Battle Tank (MBT-70).

AD-A016 486/3GA PC$5.25/MF$2.25
Life Sciences Inc Hurst Tex
Training Research Program and Plans: Advanced Simulation in Undergraduate Pilot Training.
Final rept. Jun 73-Jun 74,
W. G. Matheny. Jun 75, 103p AFHRL-TR-75-26(II)
Contract F41609-73-C-0038

Descriptors: *Pilots, *Flight training, *Air Force training, Simulation, Measurement, Performance(Human), Facilities, Training devices, Computer aided instruction.
Identifiers: Pilot training.

In this study, a survey was made among experts in pilot training to determine the important training research problems to be undertaken in order to increase training effectiveness in beginning pilot training. The highest priority problems were examined in the light of the research equipment capabilities of the Air Force Human Resources Laboratory, Flying Training Division and administrative constraints. The initial experiments in the area of training methodology and training simulator requirements are recommended and outlined. The performance equivalence approach to research in these areas is described. Studies are suggested designed to evaluate the concept and its use in training research.

AD-A016 487/1GA PC$3.25/MF$2.25
Life Sciences Inc Hurst Tex
Preliminary Operational Evaluation of an Audiovisual Instrument Trainer.
Final rept. Sep-Nov 74,
Edward E. Eddowes, Phillip L. McRee, W. Guy Matheny, and Norman A. Crowder. Jul 75, 24p AFHRL-TR-75-49
Contract F41609-73-C-0039

Descriptors: *Flight training, *Flight simulators, Audiovisual aids, Training devices, Instrumentation, Learning, Assessment.

The audiovisual instrument trainer (AVIT) presents multi-media instruction in aircraft instrument scanning, interpretation, and flight path error correction procedures. This report describes a preliminary operational evaluation of the capability of AVIT to improve a student pilot's later instrument flying performance as measured in a T-4 simulator. An operational evaluation of AVIT was conducted by the 64th Flying Training Wing at Reese AFB, Texas. The results of the evaluation test indicated that the AVIT-trained students made significantly more correct responses than student pilots not trained on AVIT. It was concluded that AVIT pretraining was effective as measured in this study. Consequently, it was recommended that further evaluation be accomplished to more adequately define the potential contribution of AVIT to UPT instrument training.

AD-A016 503/5GA PC$3.25/MF$2.25
Naval Health Research Center San Diego Calif
Predicting Academic Success for Military Paramedical Personnel,
Jerry M. Goffman. 1974, 11p Rept no. 74-51
Availability: Pub. in Jnl. of Medical Education, v50 p797-804 Aug 75.

Descriptors: *Naval training, *Medical personnel, Effectiveness, Mathematical prediction, Paramedical sciences, Performance tests, Personnel selection, Hospitals, Naval personnel, Ratings, Performance(Human), Failure, Factor analysis, Demography, Biographies, Attrition, Attitudes(Psychology), Reprints.
Identifiers: Academic success prediction, Paramedical personnel, Cognition.

The utilization of selected cognitive, demographic, and personal history measures as predictors of academic success for Naval Hospital Corps School personnel undergoing paramedical training was investigated using a sample of 1,448 students. A composite criterion score reflecting grade-point average as well as administrative discharge was related to a number of preservice cognitive and noncognitive predictors. Multiple regression techniques were used to weight specific variables and to predict performance in a crossvalidation sample. Findings indicated that demographic and personal history measures contributed uniquely to prediction of academic success. (Author)

AD-A016 579/5GA PC$3.75/MF$2.25
Chief of Naval Education and Training Support Pensacola Fla
Training Effectiveness of Films Developed Using Systems Approach to Training Principles.
Final rept.,
Robert J. Biersner. Aug 75, 42p Rept no. CNETS-4-75

Descriptors: *Training films, Naval training, Damage control, Breathing apparatus, Oxygen equipment, Instructional material, Recruits, Learning, Media, Motion pictures.

The Oxygen Breathing Apparatus Type A-3 film (OBA film) and Damage Control Petty Officer film (DCPO film) were evaluated for training effectiveness. Three different recruit groups (Exp 1, Exp 2, and Con groups) were used to evaluate each film. The Exp 1 groups were pre-tested for entrance level knowledge, viewed the film, and received a post-test to determine whether the knowledge level had improved. The Exp 2 groups were not pre-tested, but did view the film and received the post-test. The Con groups were pre- and post-tested but did not view the film. In addition, enlisted personnel with over two years of Navy experience who were attending a damage control familiarization course at a DC School were tested. These more experienced personnel were divided into two groups -- DC School Exp group and DC School Con group. The DC School Exp group was pre-tested, viewed the DCPO film, and then post-tested. The DC School Con group was pre- and post-tested, but did not view the DCPO film.

AD-A016 586/0GA PC$3.75/MF$2.25
Naval Training Equipment Center Orlando Fla
Device 2F90 Flying Qualities and Performance Evaluation and Discrepancy Correction.
Final rept. Mar-Oct 74,
William T. Harris. Sep 75, 42p Rept no. NAVTRAEQUIPC-IH-245
See also report dated Aug 72, AD-750 248.

Descriptors: *Flight simulators, *Jet training planes, Performance tests, Deficiencies, Corrections, Analog computers, Training devices, Assessment, Methodology, Modification, Jet bombers, Attack bombers.
Identifiers: TA-4J aircraft, A-4 aircraft.

Trainees experienced considerable difficulty in using Device 2F90, an operational flight trainer representing the TA-4J aircraft, in conjunction with a computer generated visual display system. This report describes the testing methodology utilized to investigate the flying qualities and performance of Device 2F90. Discrepancies determined and corrections of those discrepancies are discussed.

AD-A016 634/8GA PC$5.25/MF$2.25
B-K Dynamics Inc Rockville Md
Mini-NAMPS Programmer's Manual,
Christa L. Lake, and Gary J. Clearwater. 1 Jul 75, 112p Rept no. BKD-TR-3-196
Contract N00014-72-C-0526

Descriptors: *Manpower utilization, *Naval personnel, *Computer operators, *Programmers, Instruction manuals, Job analysis, Subroutines, Inventory control, Data processing, Naval budgets, Cost analysis.
Identifiers: IBM 360 computers, IBM 370 computers.

The Manual is designed for the technical staff responsible for operating and maintaining the Mini Naval Manpower Planning System (Mini-NAMPS System). It describes the purpose, necessary preparation and execution order of the various tasks comprising the system.

AD-A016 639/7GA PC$3.25/MF$2.25
George Washington Univ Washington D C Graduate School of Arts and Sciences
An Application of Discriminant Analysis to the Problem of Assigning Variable Reenlistment Bonuses,
Sheldon E. Haber. 8 Sep 75, 24p Rept no. TR-1234
Contract N00014-75-C-0610

Descriptors: *Reenlistment, *Motivation, Careers, Naval personnel, Training, Skills, Manpower utilization, Discriminate analysis, Variables.

In the past several years much attention has been given to the impact of monetary incentives on enlistments and reenlistments. Relatively little attention, however, has been given to policies and/or procedures for improving the effectiveness of monetary incentives. In this paper discriminant analysis is applied in order to determine the criteria used by the Navy in assigning Variable Reenlistment Bonuses. Several suggestions are offered for improving the assignment of this monetary incentive.

AD-A016 677/7GA PC$3.75/MF$2.25
National Academy of Sciences-National Research Council Washington D C Comm on Hearing Bioacoustics Biomechanics
Guidelines for Developing a Training Program in Noise Survey Techniques.
Final rept.,
William Gately, Paul L. Michael, and George W. Kamperman. Jul 75, 33p EPA/550/9-75-021
Contract N00014-67-A-0244-0021
Report of Working Group 70.

Descriptors: *Personnel development, *Government employees, *Noise reduction, Law enforcement, Training, State government, Technicians, Surveys, Methodology, Measurement, Communities, Acoustic properties.
Identifiers: Complaints, Complaint investigations, Local government, Recommendations, Guidelines.

The report contains guidelines for the content, format, organization, and administration of a training program for noise survey technicians. It is intended to provide assistance to state and local governments in setting up a training program with the following objective: the training of technicians to assist in the enforcement of

noise ordinances and investigation of noise complaints. The program is directed toward trainees with a minimum of a high school education and no previous experience in acoustics. The report outlines and explains material to be covered in a 4 1/2 day training program.

AD-A016 681/9GA PC$3.75/MF$2.25
Honeywell Inc Minneapolis Minn Systems and Research Center
Feasibility of Automated Electronic Maintenance Training (AEMT). Volume II - Cost Analysis.
Final rept. 15 Nov 73-14 May 75,
R. W. Daniels, and J. E. Cronin. 30 May 75, 28p
NADC-75177-40
Contract N62269-74-C-0111

Descriptors: *Maintenance personnel, *Training, Electronics, Automation, Cost analysis, Computer aided instruction, Simulators.

The study sought to demonstrate the feasibility of Honeywell's Automated Electronic Maintenance Training (AEMT) concept for training intermediate level maintenance technicians. Costs associated with using operational hardware for such training were compared with those of using the AEMT approach.

AD-A016 724/7GA PC$3.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Comprehensive Occupational Data Analysis Programs (CODAP): Ordering of Hierarchically Grouped Case Data (KPATH) and Print KPATH (PRKPTH) Programs.
Interim rept. 2 Mar 73-1 Feb 75,
William J. Phalen. Aug 75, 30p Rept no. AFHRL-TR-75-32

Descriptors: *Job analysis, *Computer programming, Manpower, Air Force, Personnel management, Control sequences, Flow charting.
Identifiers: Comprehensive occupational data analysis program, *CODAP(Comprehensive Occupational Data Analysis Program), *KPATH computer program, *PRKPTH computer program, IBM 360/65 computers, IBM 370/155 computers, *Occupational surveys.

This is one in a series of reports written to acquaint occupational analysts occupational research personnel, and personnel managers with the functions and utilities of a set of Comprehensive Occupational Data Analysis Programs (CODAP). This technical report describes and gives examples of applications of the Ordering of Hierarchically Grouped Case Data (KPATH) and Print KPATH (PRKPTH) Programs. These programs greatly facilitate the identification of background variables having similar values for all or most cases in any hierarchical group. Because of the highly technical nature of this report, it will be of interest only to readers who have a need to understand how the CODAP KPATH and PRKPTH programs function.

AD-A016 725/4GA PC$5.25/MF$2.25
General Electric Co Daytona Beach Fla
Airborne Electro-Optical Sensor Simulation.
Final rept. May 74-Feb 75,
M. Bunker, and R. Heeschen. Jul 75, 108p
AFHRL-TR-75-35
Contract F33615-74-C-5161

Descriptors: *Training devices, *Computerized simulation, Computer programming, Forward looking infrared systems, Television systems, Low light levels, Display systems, Airborne, Simulators.

Cost effective training of personnel in operation of infrared (IR) and low light level television (LLLTV) systems requires the development of real-time ground based equipment for simulating the performance characteristics of such systems. Such hardware must be carefully specified to provide the essential degree of validity in simulation of performances and detail of visual cues. The major effort covered in this report has been the development of an extremely versatile and unconstrained software simulation model. In usch a system, increasing the complexity of scenes and of modeling computation incur no increase in cost, but are accommodated by allowing increased processing time. With essentially unconstrained scene detail capability, transfer function definition, tonal assignment capability, noise simulation characteristics, and atmospheric effects simulation, the model can readily be adjusted to simulate the characteristics of actual systems, present or future. It can further be set up to show the precise effect of simulation hardware specifications differing from actual equipment, to meet the goal of precise hardware specification.

AD-A016 726/2GA PC$3.25/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Design of a Computer-Controlled, Radom-Access Slide Projector Interface.
Final rept. Apr-Nov 74,
Paul J. Kirby, Edward M. Gardner, and Lyle R. McKnight. Aug 75, 24p Rept no. AFHRL-TR-75-20

Descriptors: *Computer aided instruction, Training, Display systems, Plasmas(Physics), Teaching methods.
Identifiers: Plato 4 system.

The Technical Training Division of the Air Force Human Resources Laboratory has a research and development mission to improve Air Force training through the application of instructional and computer technology in the administration and management of individualized instruction. Within this new pedagogic environment, a computer-controlled random-access image projection capability is desired. This is a report on the successful design, development, test and evaluation of an electronic hardware device interfacing a commercially available slide projector with a plasma panel computer terminal. The interface device allows an instructional computer program to select slides for viewing based upon the lesson/student situation parameters of the instructional strategy employed.

AD-A016 761/9GA PC$6.25/MF$2.25
Air Force Packaging Evaluation Agency Wright-Patterson AFB Ohio
Job Performance Aid Methods. (For Job Guide Manuals and Other Formats),
Frank W. James. 2 Oct 75, 158p Rept no. DSPD-75-1

Descriptors: *Job training, *Manuals, *Packaging, Instructional materials, Preparation, Air Force training, Job analysis, Technical writing, Operation, Materials, Vocabulary.
Identifiers: *Job performance aids, Job guide manuals, Illustrating.

Job Performance Aids (JPAs) primarily tell how tasks are to be accomplished. JPAs are step-by-step instructions for use in work areas and are also background training for psychological task preparedness. JPAs are intended for use in performance of tasks. They are based on the premise that anyone can perform technical tasks if specific instructions are given on the intellectual level of the performer. This report contains simplified engineering writing, techniques, and illustrating instructions.

AD-A016 812/0GA PC$5.25/MF$2.25
System Development Corp Santa Monica Calif
Shipboard Computer Integrated Instruction in General Damage Control: Development Phase.
Technical rept. 30 Nov 73-20 Dec 74,
William G. Hoyt, Alfred K. Butler, and Charles D. Hayward. Oct 75, 108p NPRDC-TR-76-17
Contract N00600-74-C-0399
See also Rept. no. NPRDC-TR-76-11, AD-A015 326.

Descriptors: *Naval training, *Computer aided instruction, Shipboard, Feasibility studies, Minicomputers, Computer programs, Data management, Damage control, Courses(Education), Cathode ray tube screens, Cassettes, On line systems, Diagnosis(General), Performance tests, Integrated systems, Validation, Off line systems, Programmed instruction, Textbooks, Instructional materials, Audiovisual aids.
Identifiers: DLG 12 vessel, NOVA 1200 computers.

This report covers the shore-based development phase of a study to determine the feasibility of a shipboard minicomputer system for Computer Integrated Instruction (CII). In CII, instruction is conducted off line and is integrated with on-line testing, diagnostics, and prescriptives. The off-line training media for this effort are programmed instruction, audio visual, and self-study guides. General Damage Control is the prototype subject area. This report describes: (1) Program development, system operation, and user procedures for CII; (2) Design and development of the CII coursewater and module tests; (3) Shore-based demonstration and checkout; and (4) Installation of the CII system aboard a demonstration ship. The follow-on shipboard test/evaluation will be conducted by the Navy.

AD-A016 815/3GA PC$5.25/MF$2.25
Rand Corp Santa Monica Calif
The Variable Tour Experiment in the Army Reserve Components.
Interim rept.,
Gus W. Haggstrom. May 75, 112p Rept no. R-1568-ARPA
Contract DAHC15-73-C-0181, ARPA Order-189

Descriptors: *Military reserves, *Recruiting, National Guard, Army personnel, Analysis of variance, Time dependence, Effectiveness, Long range(Time), Motivation, Statistical analysis, Experimental design.
Identifiers: Individual ready reserves.

This report analyzes the results of an experiment in the Army Reserve Components to test whether reducing the term of enlistment for nonprior servicemen would have a substantial effect on recruiting. Guard and Reserve units in certain states were permitted to offer potential recruits the option of enlisting in a reserve unit for only three or four years instead of the usual six-year term. The effectiveness of these options in attracting new recruits is evaluated using a cross-sectional analysis of recruiting performance across states. It appears that the three-year option (with three years in the Individual Ready Reserve) resulted in a 20-40% increase during the experimental period, and the four-year option (with two years in the IRR) yielded a 10-30% increase. The experiment is critiqued and the method for analyzing the data spelled out in detail.

AD-A016 819/5GA PC$3.75/MF$2.25
Naval Electronics Lab Center San Diego Calif
Utilization of Junior Professionals at NELC.
Technical document,
R. A. Hamilton. 2 Sep 75, 38p Rept no. NELC/TD-450

Descriptors: *Job satisfaction, Civilian personnel, Naval research laboratories, Electronics laboratories, Recruits, Effectiveness, Scientific

manpower, Graduates, Universities, Personnel development, Interviewing, Perception(Psychology), Manpower utilization, Skills, Attitudes(Psychology), Acceptability, Interpersonal relations, Social communication, Personnel management, Rotation, Careers.
Identifiers: Professional personnel, Junior professional personnel.

In this report, 'Sensing' interviews of junior professional hired as full-time employees in FY75 are used to develop a description in their own language of their understanding, from a variety of perspectives, of the degree to which their skills are utilized at the Center. Information from 29 interviews was compiled and presented to the junior professionals as a group so that they could make comments and ask questions. The findings fall into the following categories: (1) The work itself, (2) Interpersonal relations, (3) Communication, (4) Administration, and (5) Hiring. The results of the interviews are summarized and recommendations made.

AD-A016 834/4GA PC$3.75/MF$2.25
Educational Testing Service Princeton N J
Professional Issues in the Evaluation of Education/Training Programs.
Technical rept.,
Samuel Ball, and Scarvia B. Anderson. Oct 75, 40p Rept no. TR-3
Contract N00014-72-C-0433
See also report dated Aug 73, AD-767 713.

Descriptors: *Education, *Management planning and control, Effectiveness, Performance(Human), Supervision, Mathematical models, Standards, Sociometrics, Systems engineering, Analysis of variance, Statistical processes, Factor analysis, Tests, Methodology.
Identifiers: Evaluation, Concepts, Objectives.

The purpose is to codify some program evaluation principles and provide a framework for program evaluation practices. Specifically: (a) Common evaluation purposes are listed along with the general methods of investigation most apt for each purpose. (b) Types and sources of evidence are listed and are associated with general methods of investigation. (c) Types of administrative and fiscal relationships among program evaluator, program developer/director, and funding agent are delineated. (d) A checklist is provided of audiences for dissemination of results indicating appropriate communication forms for each auidence. (e) Value orientations of evaluators are defined and a means of communicating them to others is provided. (f) Needed competencies of evaluators are listed as an aid to those evaluating and training evaluators. (g) Ethical responsibilities of evaluators and related groups are presented.

AD-A016 890/6GA MF$2.25
Naval Training Equipment Center Orlando Fla Training Analysis and Evaluation Group
Analysis of Commercial Contract Training for the Navy.
Final rept. on Phase 2,
D. Robert Copeland, Roger V. Nutter, James M. Henry, William M. Swope, and Thomas F. Curry, Jr. Jun 75, 201p Rept no. TAEG-21-1
See also phase 1 dated Dec 74, AD/A-006 658.
Availability: Available in microfiche only.

Descriptors: *Industrial training, *Military personnel, Skills, Teaching methods, Costs, Management, Contracts, Instructors.

The two-part report describes the Phase II findings of a two-phase study to determine if certain Navy skill training requirements could be satisfied through contract with qualified commercial sources. The effort described in this report demonstrates the utility of the commercial contract training concept. It addresses the major issues concerned with source evaluation, skill analysis and selection, contractual considerations, and comparative training capability evaluation. It provides guidelines for analyses necessary for sound management decisions subsequent to initiation of procurement action of training services from commercial sources. TAEG Report 21-2 contains information useful to Area Vocational/Technical (VOTEC) Support Center personnel and others involved with implementation and functional management of a VOTEC program. Most importantly, Phase II presents a plan to initiate, develop, implement, manage, and administer commercial contract training programs to support appropriate active and reserve Navy skill training requirements.

AD-A016 943/3GA PC$3.75/MF$2.25
Northwestern Univ Evanston Ill Dept of Psychology
Recognition Memory for Pairs of Words as a Function of Associative Context.
Technical rept.,
Benton J. Underwood. Sep 75, 31p
Contract N00014-67-A-0356-0033

Descriptors: *Memory(Psychology), Word recognition, Psychological tests, Response.

The purpose of the study was to test a theory of associative context (defined as the association between two words in a pair) on recognition memory. The theory states that culturally associated words in a pair and non-associated words in a pair differ after a single study trial in terms of their frequency representation in memory. Two experiments were required to show that the use of mixed lists of associated and nonassociated pairs was not the appropriate way to study the effect of associative context on recognition memory. The third experiment provided no support for the theory. Recognition of associated and nonassociated pairs did not differ appreciably. The loss in recognition performance for single words taken from study pairs was the same for associated and for nonassociated pairs. Frequency judgments paralleled the results for recognition decisions in most aspects of the data.

AD-A016 968/0GA PC$8.75/MF$2.25
Human Resources Research Organization Alexandria Va
UH-1 Helicopter Mechanic (MOS 67N20) Job Description Survey: Performance of Specific Maintenance Tasks.
Technical rept.,
Russel E. Schulz, Barbara K. FitzGerald, and Wallace W. Prophet. Jun 75, 295p Rept no. HumRRO-TR-75-13
Contract DAHC19-73-C-0004
See also report dated Dec 73, AD-775 390.

Descriptors: *Helicopters, *Maintenance personnel, Job analysis, Aircraft maintenance, Army training, Individualized training, Performance, Surveys, Job training, Engineers.
Identifiers: H-1 aircraft, UH-1 aircraft.

This report is the second of two reports describing the results of a world-wide survey of the maintenance activities of over 5,000 UH-1 helicopter mechanics (MOS 67N20). A job description inventory covering 1,323 helicopter maintenance tasks was administered by mail and by research teams in the field. The report provides detailed data on the performance of the maintenance tasks by combat job incumbents in Vietnam, and a comparison of job performance by organizational and DS/GS level mechanics.

JPRS-65803 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Roundtable Discussion of the Sociophilosophical Problems of Indoctrinating Soviet Youth.
30 Sep 75, 19p
Trans. of Voprosy Filosofii (USSR) n6 p120-128 1975.

Descriptors: *Youths, *Communism, Meetings, USSR, Translations.
Identifiers: Indoctrination, Ideologies.

The report contains a review of a roundtable discussion on current problems of communist indoctrination of Soviet youths at the present stage of development of society. The discussion was sponsored by the journal Voprosy Filosofii and by the Komsomol Central Committee Higher Komsomol School.

JPRS-65849 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
General Review of Activities of the Lithuanian Academy of Sciences in 1973,
P. Dichyus. 3 Oct 75, 17p
Trans. of Akademiya Nauk Litovskoi SSR, Vilna. Trudy. Seriya B, n2 p188-197 1975.

Descriptors: *Universities, *Lithuania, Schools, Education, Translations, USSR.

The report contains a general review of the activities of the Lithuanian Academy of Sciences in 1973.

NTIS/PS-75/797/1GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Human Work Measurement (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
Carolyn Shonyo. Oct 75, 71p*

Descriptors: *Bibliographies, *Work measurement, Performance evaluation, Job analysis, Productivity, Evaluation, Management, Operations research, Human behavior, Abstracts.

Reports dealing with measurement techniques of human work at jobs and tasks are summarized. Specific topics included are work analysis and evaluation, workload management, operations analysis, task complexity, and performance measurement. (Contains 66 abstracts)

PB-244 044/4GA PC$3.25/MF$2.25
Washington Univ., St. Louis, Mo. Center for Development Technology.
Project on Application of Modern Communication Technologies to Educational Networking.
Final rept. 1 May 73-30 Apr 75,
Apr 75, 18p NSF/TIE-38871-FR75-1
Grant NSF-EC-38871

Descriptors: *Education, *Telecommunication, Urban areas, Community relations, Technology innovation, Cost analysis, Network flows.
Identifiers: Computer aided instruction.

The report is an overview of research undertaken at the Center for Development Technology of the future role and development of educational networks. The overall research effort had three parts: (1) Assessment of the role of technology in non-traditional, post-secondary education; (2) assessment of communications technologies and educational services of current and potential future uses in educational networks; and (3) synthesis of educational networks.

PB-245 320/7GA PC$10.00/MF$2.25
George Washington Univ., Washington, D.C. Rehabilitation Research and Training Center.

Development of Modern Vocational Objectives for Severely Disabled Homebound Persons: Remote Computer Programming, Microfilm Equipment Operations, and Data Entry Processes.
Final rept.,
Thomas R. Shworles. Apr 73, 372p SRS-12-55077-001
Grant SRS-12-55077

Descriptors: *Handicapped workers, *Vocational interests, *Employment, Projects, Performance evaluation, Computer programming, Data processing, Microfilm, Personnel selection, Personnel development, Services, Methodology.
Identifiers: *Homebound persons, *Disabled persons.

This project (1968 - 1973) was undertaken to demonstrate job and earning potential for competitive work of homebound and/or severely disabled persons who otherwise have not benefited from rehabilitation programs as they conventionally exist. In the lifetime of this project, three companies were formed: A non-emergency transportation service for the handicapped, a microfilm service bureau, and a data processing software company. Owned and managed by homebound severely disabled persons, these companies were developing, producing, and distributing goods and services for their community. Established by three young (ages 23-27) wheelchairbound men, the companies employed 47, were in business for 5 years, and were grossing approximately $300,000 during the last year of the project.

PB-245 339/7GA PC$7.25/MF$7.25
Urban Inst., Washington, D.C.
The Atlanta Project: How One Large School System Responded to Performance Information,
Bayla F. White, Sara D. Kelly, Dona MacNeil, Joe N. Nay, and John D. Waller. Mar 74, 136p* URI-62000, UI-507-5
Sponsored by Office of Economic Opportunity, Washington, D.C.

Descriptors: *Students, *Performance evaluation, Education, Schools, Achievement tests, Problem solving, Learning, Performance standards, Georgia.
Identifiers: Atlanta(Georgia).

A simple and economical system was developed for showing the relative performance of each school in a large urban school system. This system of visually unmistakable signals was introduced so that, especially at managerial levels in a large urban school system, decisions would not have to be made in a vacuum-that is, without clear indications of schools and grades where usually high or low performance was being achieved. The introduction of the signals during the 1972-73 school year, with excellent cooperation by Atlanta school personnel, found the signals readily accepted as a diagnostic device. Yet only a few instances could be pinpointed where management used the new information to direct attention to the schools and grades that, according to the signals, made relatively good or relatively bad showings.

PB-245 349/6GA PC$9.50/MF$2.25
RMC Research Corp., Bethesda, Md.
An Evaluation of Federal Programs to Increase the Pool of Special Education Teachers. Volume I.
Final rept.
31 Jan 73, 334p RMC-UR-190 OE-71/4
Contract OEC-0-71-3702

Descriptors: *Professional personnel, *Instructors, *Handicapped persons, Education, Grants, National government, Universities, Manpower, Questionnaires, Surveys.
Identifiers: Human resources, Special education teachers.

The report evaluates the impact of Title VI grants in order to determine what level or combinations of funding are most effective in increasing the pool of special education teachers. Also, the report examines case histories of special education teachers and assesses the alternate strategies available to BEH for increasing the teacher pool.

PB-245 602/8GA PC$5.25/MF$2.25
Washington State Univ., Pullman. Dept. of Economics.
The Role of the State in the CETA Process: A Case Study of Washington State.
Final rept.,
V. Lane Rawlins. 1 May 75, 105p* MEL-75-06
Contract DL-43-3-006-53

Descriptors: *Personnel management, *Local government, Manpower utilization, State government, Decentralization(Dispersal), Employment, Unemployment, Training, Systems analysis, Washington(State).

The report presents the results of an examination of the impact of the Comprehensive Employment Act (CETA) on relations between a state (Washington) and local manpower agencies. It deals with issues associated with decentralized planning in a centralized administrative system where political jurisdictions do not coincide with labor markets. It spotlights the conflicts between local autonomy, state coordination and Federal requirements.

PB-245 636/6GA PC$4.75/MF$2.25
Vocational Guidance and Rehabilitation Services, Cleveland, Ohio.
Roles for Sociologists in Service Organizations.
Final rept.,
James E. Trela, and Richard O'Toole. 1974, 87p SRS-12-55201-001
Contract SRS-12-55201
Prepared in cooperation with Kent State Univ., Ohio.

Descriptors: *Professional personnel, *Research management, Sociology, Social services, Rehabilitation, Personnel development, Roles(Behavior).

Based on the authors' realization that most social service organizations without academic affiliations do not include roles for researchers within their structures, and that most researchers are not trained for non-academic organizational roles, this report examines (1) How the introduction of a research role affects the social context of the organization; (2) the roles researchers can play in service organizations and; (3) the impact of the research role both within the organization and upon its services. It is principally confined to the experiences of the authors in a rehabilitation organization during a four year period (1968-1972), but it addresses the discussion to service organizations in general.

PB-245 796/8GA PC$10.00/MF$2.25
National Opinion Research Center, New York.
Southern Schools: An Evaluation of the Effects of ESAP and of School Desegregation. Volume I.
Final rept. 1970-Oct 73.
Oct 73, 351p 124A OE-72/4
Contract OEC-0-72-0557

Descriptors: *Schools, *Federal assistance programs, Evaluation, Separation, Projects, Attitude surveys, Education, Data acquisition, Finance, Economic surveys, Students, Effectiveness.
Identifiers: Segregation, Desegregation.

The report examines ESAP (Emergency School Assistance Program) and includes a discussion of the effects of ESAP and of school characteristics on student attitudes toward integration, an analysis of the effects of ESAP and school characteristics on tests of achievement, and there are also several working papers which analyze desegregation issues.

PB-245 847/9GA PC$4.25/MF$2.25
Dunlap and Associates, Inc., Darien, Conn.
Police Management Training Factors Influencing DWI Arrests.
Final technical rept. Jun 74-May 75,
Edward W. Bishop. Sep 75, 71p DOT-HS-801 731
Contract DOT-HS-4-00987

Descriptors: *Specialized training, *Police, Motor vehicle operators, Alcoholism, Law enforcement, Project planning.
Identifiers: Drinking drivers, *Driving while intoxicated offenders, DOT/5H.

The development of training material for police management personnel concerning command and supervisory actions appropriate for more effective DWI enforcement is described. The training is based on two research studies that identified environmental and attitudinal factors that influence a patrolman's arrest decision. The training is designed as a workshop and uses the case-study technique. The development of both content and format is described as well as the results of pilot test and evaluation.

TT-74-53392/2 PC$4.25
Office of Education, Washington, D.C.
Selected Bibliography and Abstracts of Educational Materials in Pakistan. Volume 8, Number 2, 1974. Period Covered April-June 1974.
1974, 61p
The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Education, *Bibliographies, *Pakistan, Management, Facilities, Adults, Visual aids, Theories, Objectives, Planning, Research, Tests, Instructors, Books, Females, Students, Instructional materials, Classifications, Health, Medicine, Psychology.
Identifiers: Curricula, Semester system, Higher education.

A bibliography on educational materials in Pakistan contains abstracts on adult, agricultural, health, Islamic, science, teacher, medical, language, technical, and women's education; educational goals, planning, reforms, research, philosophy, psychology, guidance, and methods; and examinations, libraries, children's literature, and textbooks. Portions of this document are not fully legible.

5J. Psychology (Individual and Group Behavior)

AD-A016 293/3GA PC$3.25/MF$2.25
American Univ Washington D C Dept of Psychology
Token Reinforcement and Selective Exposure to Persuasion.
Technical rept.,
Elliott McGinnies, Rose Rolando Forbes, and Richard Wellins. Sep 75, 22p Rept no. TR-7
Contract N00014-68-A-0245-0004

Descriptors: *Psychological tests, *Attitudes(Psychology), Behavioral science, Theory, Test methods, Questionnaires, International relations, Exposure(General).
Identifiers: Token reinforcement, Reinforcement(Psychology), Persuasion, Selective exposure.

Subjects with neutral attitudes were shown pairs of statements, one of which supported and one of which opposed extension of the three-mile international maritime limit. Some subjects received a nickel from a token dispenser whenever they pressed a switch indicating preference for a pro-extension argument; others received nickels for choosing con-extension statements. Control subjects simply made choices without reinforcement. Later the subjects were offered a choice of listening to one or both of two messages advocating, respectively, that a new African nation be either encouraged or disuaded in efforts to unilaterally extend its maritime boundaries. The reinforcement results suggest that selective exposure to information can be viewed as an operant response that can be manipulated by reinforcement tokens.

AD-A016 329/5GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Psychiatry
Limbic Structures and Behavior: Endocrine Correlates,
H. Ursin, G. D. Coover, C. Koehler, M. Deryck, and T. Sagvolden. 1975, 12p
Contract N00014-67-A-0112-0005, Grant NGL-05-020-326
Availability: Pub. in Progress in Brain Research, v42 p263-274 1975.

Descriptors: *Learning, *Avoidance, Physiochemistry, Brain, Lesions, Blood plasma, Physiological effects, Rats, Corticosteroid agents, Conditioned response, Behavior, Modification, Problem solving, Motivation, Perception, Fear, Electric current, Stimulation(Physiology), Reduction, Correlation techniques, Stress(Physiology), Reprints.
Identifiers: Limbic lesions, Electric shock.

This paper concludes that, in rats with limbic lesions, the corticosterone levels change in accordance with changes in motivation, reinforcement effect, or problem-solving ability. Without measuring a reliable indicator of the internal state of the rat, it is difficult to decide which psychological mechanisms are involved. For all the groups studied, the corticosterone response does not depend in any simple 'physical' way on the external situation such as shock levels. A very importance factor is how the rat behaves, or, more accurately, how the rat perceives and solves the problem.

AD-A016 330/3GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Psychiatry
Effects of Prior Aversive Stimulation on Heart Rate Responses to Open Field Exposure in the Rat,
Donald V. Chalmers, Sallyeana Coyle, and Seymour Levine. 15 Jul 74, 4p
Contract N00014-67-A-0112-0009
Availability: Pub. in Physiology and Behavior, v14 p13-16 1975.

Descriptors: *Avoidance, Stress(Physiology), Physiological effects, Rats, Electric current, Stimulation(Physiology), Response(Biology), Heart, Rates, Deceleration, Reactivities, Defense mechanisms(Psychology), Conditioned response, Adaptation(Physiology), Reprints.
Identifiers: Electric shock, Heart rate.

Heart rate (HR) responses to open field (OF) exposure were compared between rats previously exposed to intense, inescapable electric shock (preshock, PS) and Controls. Results indicated that (1) Control animals showed a steady increase in HR across a 3 min exposure on each of 4 days of testing, while PS animals showed an initial HR deceleration followed by partial recovery on each day; (2) the HR response of PS animals in the OF was not related to any HR response to shock during treatment; and (3) the HR responses of both PS and Control animals were specific to the OF situation, with both groups showing steady HR deceleration across 3 min after being placed in their home cages. Results were discussed in terms of (1) the apparently altered perception of environmental change produced by PS, and (2) the possible role of the HR acceleration in Controls in terms of minimizing the impact of aversive stimulation. (Author)

AD-A016 331/1GA PC$3.25/MF$2.25
Stanford Univ Calif School of Medicine
Corticosterone Levels during Avoidance Learning in Rats with Cingulate Lesions Suggest an Instrumental Reinforcement Deficit,
Gary Coover, Holger Ursin, and Seymour Levine. 9 Aug 73, 8p
Contract N00014-67-A-0112-0009
Availability: Pub. in Jnl. of Comparative and Physiological Psychology, v57 n5 p970-977 1974.

Descriptors: *Learning, *Avoidance, Corticosteroid agents, Physiochemistry, Conditioned response, Blood plasma, Rats, Brain, Lesions, Response(Biology), Discrimination, Cerebral cortex, Stress(Physiology), Stimulation(Physiology), Electric current, Fear, Physiological effects, Behavior, Modification, Reprints.
Identifiers: Cingulate lesions, Reinforcement(Psychology), Electric shock.

Male Moelle-Wistar rats with lesions restricted to the cingulum bundle and rostral one third to one half of the cingulate cortex (n = 12) exhibited no deficit compared with operated control animals (n = 15) in the acquisition of 2-way active avoidance. However, the cingulate-lesioned animals did not exhibit the increase in intertrial sniffing and grooming or the decline in plasma corticosterone levels to the degree observed in the control animals in the course of acquisition and stabilization of the avoidance response. The primary effect of this lesion may therefore be less effective reinforcement of the instrumental response. (Author)

AD-A016 335/2GA PC$3.75/MF$2.25
Army Administration Center Fort Benjamin Harrison Ind
A Progressive Model for Leadership Development.
Leadership monograph series no. 7,
Stephen D. Clement, and William H. Zierdt, III. Jun 75, 30p
Report on Studies of Leadership for the Professional Soldier.

Descriptors: *Leadership, *Personnel development, *Military personnel, Leadership training, Army planning, Personnel selection, Performance(Human), Models, Theory, Effectiveness, Organizations, Interpersonal relations, Group dynamics, Behavioral science.

The Leadership Monograph Series is dedicated to keeping Army leaders informed on a broad range of pertinent findings and techniques of leadership and management. The progressive model for leadership development presented in this monograph provides a broad, systematic and integrated view of the entire spectrum of leader development from the soldier's initial selection as an officer or noncommissioned officer throughout the individual's career.

AD-A016 343/6GA PC$7.25/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
An Investigation and Analysis of Perceived Conflict between Military and Civilian Personnel in an Air Force Combined Work Group.
Master's thesis,
Paul V. Ellis, III, and Robert J. Welch. Aug 75, 202p Rept no. SLSR-32-75B

Descriptors: *Military personnel, *Civilian personnel, *Group dynamics, *Conflict, Human resources, Air Force, Attitudes(Psychology), Organizations, Stress(Psychology), Morale, Theses.

The purpose of the study was to investigate the existence of conflict between military and civilian personnel in an Air Force combined work group. The study concentrated on Air Force officers and General Schedule civilian personnel, and was an initial attempt to measure conflict between the military and civilian personnel from the aspect of group processes. The study was conducted in an Air Force Systems Program Office, and required the design of an instrument to measure conflict, using difference in perceptions as the basis of measurement. The authors, using a structured interview approach, defined and measured group perceptions in terms of four variables: goals, attitudes, contributions, and group identity.

AD-A016 376/6GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
The Effect of Complex Information Processing Techniques Applied to Short Term Memory of Military Officers.
Master's thesis,
Kenneth Cameron Kodalen. Sep 75, 44p

Descriptors: *Information processing, *Memory(Psychology), Humans, Retention(Psychology), Short range(Time), Theses.
Identifiers: *Information processing(Psychology), Short term memory.

The information processing rate is an important indicant of how well a naval systems operator will perform a complex task. The complex task used for this experiment was a highly sophisticated psychomotor-testing instrument designed to provide sensitive, reliable measurement or response speed, accuracy and short term memory which incorporated four delay modes. Analysis of the data collected from twenty subjects showed that as the mental functions of the task became more complex, then more information was processed. The additional increase of information was not detected using simple information processing techniques.

AD-A016 378/2GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
Time-Sharing Effects on Pilot Tracking Performance.
Master's thesis,
John Patrick Kennedy. Sep 75, 47p

Descriptors: *Performance(Human), *Pilots, *Tracking, Performance tests, Time sharing, Difficulty, Visual signals, Stimuli, Rates, Analysis of variance, Reaction time, Correlation techniques, Theses, Naval personnel.
Identifiers: Task performance, Simultaneous stimuli.

Subjects were required to simultaneously perform a two-dimensional tracking task and respond to a set of lights with toggle switches. Five levels of difficulty and two stimulus presentation rates were involved in the secondary task. The purpose of the experiment was to examine time-sharing performance of experienced military pilots and to investigate differences in performance by pilots of different types of aircraft.

AD-A016 613/2GA PC$3.75/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
Intelligent CAI.
Final rept. 1 Mar 71-31 Aug 75
Allan Collins, and Mario C. Grignetti. Oct 75, 47p Rept nos. BBN-3181, TR-6
Contract N00014-71-C-0228, ARPA Order-2284
See also report dated Mar 75, AD-A007 560.

Descriptors: *Computer aided instruction, *Education, Learning machines, Man machine systems, Natural language, Teaching methods, Computer applications.
Identifiers: Tutor system, Scholar system, Question answering systems.

This paper describes the capabilities now available for building intelligent, tutorial CAI systems as exemplified by several systems including Tutor-SCHOLAR, Map-SCHOLAR, NLS-SCHOLAR and SOPHIE. The systems illustrate how a variety of sophisticated techniques can be used for tutoring different kinds of knowledge by carrying on dialogues in natural language. The systems have been developed to explore how to provide each student with his own personal, expert tutor.

AD-A016 627/2GA PC$5.75/MF$2.25
Stanford Research Inst Menlo Park Calif Naval Warfare Research Center
A Brief Survey of Potential Decision Aids for the Task Force Commander and his Staff.
Research memo.,
James Roland Payne, James M. Ketchel, Terry J. Braunstein, and Marshall C. Pease. Aug 75, 140p Rept no. NWRC-RM-84
Contract N00014-75-C-0742

Descriptors: *Decision making, *Command and control systems, Naval operations, Operations research, Task forces, Computers, Fleet exercises, Computer applications, Risk analysis, War games, Scheduling, Message processing, Checkout procedures, Decision theory, Algorithms, Display systems, Management information systems.

A list of 36 concepts of potential decision aids for a task force commander (CTF) and his staff are discussed. They are evaluated against 32 types of decisions made by a CTF and his staff. The results of that evaluation and a qualitative analysis are combined to recommend an ordering of the potential decision aids for inclusion into the development effort by the ONR Operational Decision Aids Project. (Author)

AD-A016 649/6GA PC$4.25/MF$2.25
Florida Univ Gainesville Coll of Business Administration
Least Preferred Coworker Scales: Research and Development.
Technical rept.,
William M. Fox. 1 Sep 74, 62p Rept no. TR-70-5
Contract N00014-68-A-0173-0010

Descriptors: *Psychological tests, *Leadership, Behavior, Attitudes(Psychology), Factor analysis, Decision making, Supervisors.

The meaning of Least Preferred Coworker Scores (in various forms) is explored in terms of relationships among LPC data drawn from various samples and scores for variables. Factor analyses of the Fiedler Instrument and the author's developmental 32 scale instrument are presented. Also, mean and retest reliability data for individual scales are presented.

AD-A016 650/4GA PC$4.75/MF$2.25
Florida Univ Gainesville Coll of Business Administration
An Analysis of Military Leadership in a Realistic Field Setting.
Technical rept.,
William M. Fox. 1 Sep 75, 80p Rept no. TR-70-6
Contract N00014-68-A-0173-0010

Descriptors: *Leadership, Motivation, Personality, Decision making, Behavior.

A field study involving 583 ROTC summer camp platoon members and 104 acting platoon leaders produced significant behavioral differences between high and low performing leaders, and the way in which they were perceived by high and stressed followers. Normative as well as descriptive data were collected and analyzed. High specific behavioral correlates with a consolidated Leadership Performance Score were obtained. Clear-cut behavioral correlates of leader LPC scores were obtained, also.

AD-A016 651/2GA PC$3.25/MF$2.25
Florida Univ Gainesville Coll of Business Administration
Final Report for Behavioral Research Contract 1 March 1970 - 30 June 1974,
William M. Fox. 20 Sep 75, 12p Rept no. TR-70-7
Contract N00014-68-A-0173-0010

Descriptors: *Behavioral science, *Scientific research, Surveys, Cross culture(Sociology), Statistical processes, Management, Leadership, Questionnaires, Group dynamics, Attitudes(Psychology).

A review of various studies which were completed (and others which were attempted) during the term of the contract is presented, along with discussion of key findings. Also, the author explains the reasons why he feels there is a paramount need for long-term longitudinal studies to explore lead-lag relationships among leader behavior, subordinate satisfaction and performance, and other environmental variables.

AD-A016 722/1GA PC$3.75/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
NEPTUNE: Modifications and Current Applications.
Final rept. Jun 73-Dec 74,
Russell A. Benel, and William F. Storm. Aug 75, 39p Rept no. SAM-TR-75-20

Descriptors: *Psychomotor tests, Performance(Human), Job analysis, Psychological tests.

Recent modifications of the Neptune psychomotor test apparatus and a brief description of individual tasks are presented. Currently available system workload program listings and typical learning data under these workloads are discussed. Standardized instructions for the Neptune operator console are provided. Previous Neptune use is documented in an annotated bibliography.

AD-A016 727/0GA PC$7.00/MF$2.25
Ohio State Univ Research Foundation Columbus
Management of Social Incentives in Air Force Technical Training: A Field Experiment.
Final rept. Jun 72-Feb 75,
Milton D. Hakel, Richard J. Klimoski, and Michael T. Wood. Sep 75, 183p AFHRL-TR-75-11
Contract F41609-72-C-0044

Descriptors: *Motivation, *Teaching methods, Air Force training, Behavior, Social psychology, Leadership, Attitudes(Psychology), Instructors, Students.
Identifiers: Social reinforcement.

This report presents the rationale, design, and results of a field experiment which explored the use of social incentives in Air Force technical training. Four experimental treatments of varying complexity were introduced sequentially into a resident training avionics course. These treatments attempted to increase the incidence of student leadership behaviors on the assumption that social interaction would be reinforcing and lead to improved performance. Dependent variables included block exam scores, time to complete blocks, and student attitudes. Results showed that none of the experimental systems had an appreciable effect on performance. One system, however, did have a significant positive effect on student attitudes toward fellow trainees. Various alternative explanations are proposed along with suggestions for future research.

AD-A016 832/8GA PC$5.75/MF$2.25
North Carolina Univ At Charlotte Coll of Business Administration
Attitude Differences and Task Performance for Black and White Naval Recruits in Problem-Solving Groups of Differing Size and Racial Composition.
Technical rept.,
John A. Ruhe, and William R. Allen. 31 Oct 75, 126p Rept no. TR-75-1
Contract N00014-75-C-0900
Prepared in cooperation with Rhode Island Univ., Kingston.

Descriptors: *Performance tests, *Psychological tests, *Ethnic groups, *Naval personnel, Comparison, Recruits, Squad level organizations, Performance(Human), Leadership, Job satisfaction, Behavior, Group dynamics, Interactions.
Identifiers: Black white comparisons, Squad leaders, Task performance, Expectation.

A field study was made in which 288 black and white naval personnel (224 recruits and 64 squad leaders) in groups of varying size and racial composition performed two problem-solving tasks (knot tying and ship-routing). Black and white leaders, subordinates and group types (25% black tetrads, 75% black tetrads, racially balanced dyads and tetrads) were compared in measures of self-esteem, duration of speech, locus of control, job and general satisfaction, Bales IPA behavior, and performance on the tasks.

AD-A016 855/9GA PC$3.75/MF$2.25
Northwestern Univ Evanston Ill Dept of Psychology
The Spacing Effect: Additions to the Theoretical and Empirical Puzzles.
Technical rept.,
Benton J. Underwood, Susan M. Kapelak, and Robert A. Malmi. Sep 75, 45p
Contract N00014-67-A-0356-0033

Descriptors: *Psychological tests, *Recall, Performance tests, Words(Language), Separation, Hypotheses, Attenuation, Memory(Psychology), Test methods, Statistical processes, Correlation techniques, Analysis of variance.
Identifiers: Massed practice spacing, Dispersed practice spacing.

Four studies examined the MP-DP effect (spacing effect) in four quite different situations: recognition of letters, verbal discrimination, short free recall lists, and recall of MP items presented twice with an intervening interval inserted to produce forgetting. MP-DP differences are discussed for all studies. Subjects with a low criterion of responding in the letter study lost the MP-DP effect over a 30-second delay, and subjects with a high criterion did not. A clear MP-DP effect, but not lag effect, was found only with unmixed verbal discrimination lists. In free recall a sharp lag effect was shown for words presented three times but not for words presented twice. The results pose problems for current theoretical ideas about the spacing effect.

AD-A016 870/8GA PC$3.75/MF$2.25
Army Aeromedical Research Lab Fort Rucker Ala
Perceived Velocity and Altitude Judgments During Rotary Wing Aircraft Flight.
Final rept.,
Richard N. Armstrong, Mark A. Hofmann, Michael G. Sanders, Lewis W. Stone, and

Charles A. Bowen. Sep 75, 30p Rept no. USAARL-76.3

Descriptors: *Judgement(Psychology), *Ground speed, *Pilots, Helicopters, Man machine systems, Estimates, Altitude, Perception(Psychology), Errors, Visual perception, Day, Night, Airspeed, Flight simulation, Aviation safety, Army aircraft, Terrain following, Range(Distance), Cues(Stimuli), Performance(Human), Analysis of variance.

Eight Army rotary wing aviators made judgments concerning the ground speed and altitude of a UH-1 helicopter. Combinations of three ground speeds and four altitudes were used across four visual conditions including daylight and simulated night environments. In general, the results indicate: (1) Absolute error in ground speed estimations increased as altitude increased; (2) At ground speeds above 50 knots there was a tendency to underestimate ground speeds, and below 50 knots ground speed estimates were dependent upon visual cinditons. (3) Absolute error in altitude judgment increases with aircraft altitude; and (4) At low altitudes the trend is toward understimation and as altitude and airspeed increase the tendency is to overestimate altitude. These and other results are discussed as well as their possible implications for conduct of safe flight. (Author)

AD-A016 879/9GA PC$5.25/MF$2.25
Army Missile Command Redstone Arsenal Ala Directorate for Product Assurnace
Amalgamating the Rankings of Judges with Various Degrees of Expertise.
Technical rept.,
Mack W. Wyatt. 24 Sep 75, 117p Rept no. QSD-TR-76-1

Descriptors: *Judgement(Psychology), Specialization, Assessment, Ranking, Weighting functions, Specialists, Group dynamics, Decision making, Majorities, Validation, Sensitivity, Statistical analysis, Information, Background.
Identifiers: Expertise, Opinions, Knowledge.

There have been many methods proposed for amalgamating the individual opinions of a group of experts into a group opinion. Most of these do not recognize the fact that in this day of specialization the judges may have varying degrees of expertise or knowledge of the entities being considered. A person may be an expert in a given field, but his expertise may vary considerably from topic to topic within that field. This paper proposes a method for weighting the opinion expressed on each entity being considered, according to the degree of knowledge or expertise possessed by the judge. This is accomplished by a modification of Arrow's Rule of Majority Procedure for amalgamating group opinions. (Author)

AD-A016 894/8GA PC$3.75/MF$2.25
Army Natick Development Center Mass
The Food Service Worker and the Travis Air Force Base Experimental Food System: Worker Opinion and Job Satisfaction.
Technical rept.,
Lawrence E. Symington, and Herbert L. Meiselman. Apr 75, 32p Rept no. NDC-TR-75-94-FSL

Descriptors: *Food handlers, *Job satisfaction, Food dispensing, Attitudes(Psychology), Dining halls, Human factors engineering.

Surveys and interviews were administered to both civilian and military food service workers at Travis Air Force Base, both before and after dining system changes, to assess job satisfaction, opinions about additional training, and opinions about environmental and equipment features relevant to potential human factors problems.

AD-A016 942/5GA PC$3.75/MF$2.25
Northwestern Univ Evanston Ill Dept of Psychology
The Integration of Discrete Verbal Units in Recognition Memory.
Technical rept.,
Benton J. Underwood, Susan M. Kapelak, and Robert A. Malmi. Sep 75, 39p
Contract N00014-67-A-0356-0033

Descriptors: *Memory(Psychology), Word recognition, Test construction(Psychology), Learning, Reaction time, Response.

The two experiments examined factors underlying false alarms on recognition tests when the elements of the test items were presented alone for study at different points in time, and when the elements were parts of different two-element units during study. In the former case lag between presentation of the two elements was varied. In one experiment two independent words were presented for study with varying lags, with the test being for the two words as a pair. In the other, elements of a compound words were presented separately with the test being on the compound word. The subjects had to decide whether the two words had or had not been presented together on the study trial. Lag was not found to be a relevant variable and this fact, plus the findings on a special test of temporal discrimination, led to the conclusion that temporal judgments were not involved in the false alarms observed. Because it seems unlikely that a meaning response, evoked on the study trial, was also evoked on the test trial, the false alarms observed were attributed to the visual-phonetic-articulatory responses of the elements which were evoked on both the study and test trials.

AD-A016 970/6GA PC$3.75/MF$2.25
University of South Florida Tampa Dept of Psychology
Instrumental for Classical Conditioning Techniques for Establishing Chronic Autonomic Arousal.
Annual rept.,
H. D. Kimmel, D. C. McLeod, and R. A. Burns. 1 Aug 75, 32p Rept no. TR-1
Contract DAMD17-74-C-4121

Descriptors: *Conditioning(Learning), *Autonomic nervous system, Emotions, Conditioned response, Attention, Stimuli, Avoidance, Response(Biology), Heart, Galvanic skin response, Psychophysiology, Monkeys, Experimental data.
Identifiers: *Arousal, Heart rate.

Two groups of monkeys received discriminated training within either classical or instrumental paradigms. Instrumental animals made more unelicited skin conductance responses during avoidance than during punishment, and showed higher heart rates than classical animals. Conclusions suggested the practicality of bringing autonomic arousal under stimulus control.

AD-A016 974/8GA PC$3.25/MF$2.25
Louisville Univ Ky Performance Research Lab
Assessment of Auditory Acuity, Ear Protection, and Prediction of Hearing Loss in Military Personnel.
Interim technical rept.,
Michel Loeb, George A. Luz, Dennis Sheidler, and Sharon Vanderhei. Sep 73, 16p Rept no. TR-73-1
Contract DADA-17-72-C-2039

Descriptors: *Auditory acuity, *Ear protectors, Deafness, Hearing, Military personnel, Threshold effects, Assessment.
Identifiers: *Hearing conservation, Threshold shift.

It was suggested that it might be possible to predict hearing levels of Army drill instructors on the basis of single observations as to whether they were or were not wearing plugs. Although the data were in the predicted direction, differences between wearers and non-wearers of plugs, though appreciable, were not statistically significant. It also was observed that the drill instructors hearing was considerably (and significantly) poorer than that of new trainees.

AD-A016 995/3GA PC$4.75/MF$2.25
Army War Coll Carlisle Barracks Pa
Arms and the Campus in 1975: Army ROTC in Transition.
Individual research rept.,
Billy J. Wright. 25 May 75, 89p

Descriptors: *Military reserves, *Attitudes(Psychology), Students, Instructors, Universities, Questionnaires, Surveys.
Identifiers: Reserve Officer Training Corps.

The basic problem confronting ROTC is mission accomplishment--obtaining officers in sufficient numbers to meet Army requirements. Problems bearing on mission accomplishment are generally a reflection of the society as a whole. Although, for the first time in several years, this year's enrollment exceeds that of the previous year, ROTC is far from trouble-free. This paper reviews the history and background of ROTC, discusses past and present problem areas, and assesses the program in light of the current national and international situation. The research is based on a literary search at the US Army War College Library, visits to two colleges, a review of current surveys, the results of 823 questionnaires received from 90 colleges, and information obtained from Department of the Army and training and Doctrine Command.

AD-A016 998/7GA PC$6.25/MF$2.25
Army War Coll Carlisle Barracks Pa
The Roles of Women in the Army and Their Impact on Military Operations and Organizations.
Group research project,
John H. Batts, Richard A. Burr, Richard F. Fischer, Gary C. Mahan, and John E. Paganelli. 23 May 75, 152p

Descriptors: *Attitudes(Psychology), *Army personnel, *Females, Training, Recruiting, Limitations, Questionnaires, Surveys.

Problems inherent in the expanded utilization of female soldiers in the US Army are numerous. Some problems such as uniforms, billeting, assignments and training are obvious and with proper planning can and will be solved by commanders and staffs throughout the chain of command. Other problems, perhaps not so obvious, have not received sufficient attention and remain of concern: fraternization; attitudes of male and female soldiers; effects of the Equal Rights Amendment; deployability; and requirements unique to women such as pregnancy, abortion, child care, and assignment of military couples. Policies as expressed by the Secretary of Defense, Secretary of the Army, Chief of Staff of the Army, and major commanders are not disseminated in sufficient detail to insure that soldiers understand what policies are applicable to the utilization of female soldiers. Many soldiers, both male and female, are concerned that supervisors do not have sufficient training to cope with the sexually-mixed work environment, particularly as this environment deals with discipline, extra duties, and physical capabilities of the female soldier.

COM-75-11473/6GA PC$3.75
National Bureau of Standards, Washington, D.C.

Color in Our Daily Lives.
Consumer information series,
Deane B. Judd. Mar 75, 35p* NBS-CIS-6

Descriptors: *Color, *Visual perception, *Esthetics, Environments, Human factors engineering, Utilization, Objectives, Background, Contrast, Psychological effects, Theories.

The booklet discusses the use of color to achieve various goals, particularly to make people, clothing, and homes more attractive. It explains the principles governing color relationships and use, with carefully designed illustrations to point out the effects on feelings and environmental characteristics.

JPRS-65639 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Reflection of Traces of Emotional Excitation in EEG Rhythms of Children,
L. G. Voronin, V. F. Konovalov, and I. S. Serikov. 10 Sep 75, 6p
Trans. of Akademiya Nauk SSSR. Doklady, v222 n1 p251-253 May/Jun 75.

Descriptors: *Electroencephalography, *Emotions, *Bioelectricity, Memory, Children, Rhythm(Biology), Human behavior, Physiological psychology, USSR, Translations.

The report contains a study of the extent of information communicated by the bioelectric reactions of the brain in relation to the regularities of formation, retention and reproduction of information imprinted on the memory. It particularly examines the variability in the rhythms of electrical activities of the large hemispheres in the registration and reproduction of the information taken in by the brain.

JPRS-65772 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Linguistic Features of Speech in Tense Emotional State,
E. L. Nosenko. 26 Sep 75, 11p
Trans. of Zhurnal Vysshei Nervnoi Deyatelnosti (USSR) v25 n2 p253-259 1975.

Descriptors: *Stress(Physiology), *Stress(Psychology), *Psycholinguistics, *Linguistics, *Speech disorders, Behavior disorders, Stuttering, Psychosomatic disorders, Speech articulation, CNS disorders, Emotions, USSR, Translations, Patients.

The report contains a comparison of oral expression by the same experimental subjects under normal conditions and in a state of emotional stress permitting isolation of linguistic features of the formation of oral expression under emotional tension.

JPRS-65774 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Conditioning by Electrical Stimulation of Limbic Structures,
T. N. Oniani. 29 Sep 75, 15p
Trans. of Zhurnal Vysshei Nervnoi Deyatelnosti (USSR) v25 n2 p230-238 1975.

Descriptors: *Electrical shock, *Limbic system, *Conditioned responses, *Brain, *Emotions, Stimulus(Psychophysiology), Central nervous system, Cats, Laboratory animals, Electrophysiology, Reflexes, USSR, Translations, Animal behavior, Responses, Physiological psychology.
Identifiers: Neurophysiology.

The report contains a study of the possibility of producing conditioned emotional reactions based on electrical stimulation of limbic structures.

JPRS-65775 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Influence of Electrical Stimulation on Human Verbal Memory,
V. B. Grechin. 29 Sep 75, 13p
Trans. of Zhurnal Vysshei Nervnoi Deyatelnosti (USSR) v25 n2 p245-252 1975.

Descriptors: *Electrical shock, *Memory, Stimulus(Psychophysiology), Responses, Recall, Retention(Psychology), Recognition, Humans, Central nervous system, Verbal learning, Brain, USSR, Translations, Electrophysiology.
Identifiers: Neurophysiology.

Neurono-glial populations participate in securing human mental processes. The dynamics of the functional condition of these populations correlate with correct performance of tests for operative memory. The populations include zones, which secure agreement of the sensory image with a permanent imprint, and detectors of error. Electrical stimulation (ES) of these cerebral zones alters the mnestic ability of patients. ES of a part of the detectors of error evoke overall changes in the status of the patients. The result of ES of detectors is determined by their role in securing mental activity and by the ES action applied at each stage of the mnestic act. Two kinds of detectors of error represent different links in subcortical securing of mental activity and human verbal memory.

JPRS-65806 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Systemic Approach to Psychology,
B. F. Lomov. 30 Sep 75, 24p
Trans. of Voprosy Psikhologii (USSR) n2 p31-45 1975.

Descriptors: *Psychology, *Behavioral sciences, *Systems analysis, Methodology, Classification, Trends, Problem solving, Human behavior, USSR, Translations.

The report contains a discussion of some questions related to the systemic approach in psychology.

N75-31711/5GA PC$6.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Role of the Hypothalamic Neurosecretory System in Adaptive Reactions of the Body: Contribution to the Problem of Neurohormonal Interactions.
N. V. Popovichenko. Sep 75, 156p NASA-TT-F-16329
NASA ORDER W-13-183
Tran-Transl. Into English of the Book "Rol'Gipotalamicheskoy Neyrosekretornoy Sistemy V Prisposobitel'Nykh Reaktsiyarh Organizma" Kiev, Naukova Dumka Press, 1973 p 1-125.

Descriptors: *Endocrine secretions, *Hormone metabolisms, *Hypothalamus, *Physiological responses, Activity (Biology), Adrenal gland, Central nervous system, Neurology.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31713/1GA PC$3.25/MF$2.25
Stanford Univ., Calif. Dept. of Psychiatry and Behavioral Sciences.
Influence of Chronic and Repeated Stress on the Pituitary-Adrenal System and Behavior.
Final Technical Report.
S. Levine. Sep 75, 11p NASA-CR-143622
Contract NGL-05-020-326

Descriptors: *Adrenal gland, *Behavior, *Pituitary gland, *Stress concentration, Adrenal metabolism, Adrenocorticotropin (Acth), Physiological effects, Pituitary hormones, Psychological effects.

For abstract, see STAR 1322

PB-246 002/0GA PC$10.50/MF$2.25
Research Triangle Inst., Research Triangle Park, N.C. Center for the Study of Social Behavior.
A National Study of Adolescent Drinking Behavior, Attitudes and Correlates.
Final rept.,
J. Valley Rachal, Jay R. Williams, Mary L. Brehm, Betty Cavanaugh, and R. Paul Moore.
Apr 75, 405p* NIAAA/NCALI-75-27
Grant HSM-42-73-80

Descriptors: *Human behavior, *Alcoholic beverages, *Students, Alcoholism, Ingestion(Biology), Pattern recognition, Adolescence, Attitudes, Problem solving, Habits, Research, Questionnaires, Classifications, Age, Sex, Ethnic groups, Family relations.
Identifiers: Youths, Problem drinkers, High school students.

A questionnaire survey was conducted in the Spring of 1974 among U.S. high school students concerning drinking practices, drinking attitudes, and problems related to alcohol consumption among American youth. The questionnaires were completed by a total of 13,122 students in grades 7-12 for a nationwide 2-stage, stratified sample. This report contains a brief background statement on drinking during adolescence, and sets forth the purpose, methodology, and major findings of the research.

5K. Sociology

AD-A016 381/6GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
The Social Welfare Under Stochastic Demand.
Master's thesis,
Nguyen Minh Cang. Sep 75, 66p

Descriptors: *Social welfare, Economic models, Cost analysis, Risk, Theses.

The report develops two kinds of models, the first is to maximize the expected social welfare, the second is to maximize the expected monopoly profit; both models involve random demand.

AD-A016 981/3GA PC$10.00/MF$2.25
American Institutes for Research Washington D C International Research Inst
The Marine Corps Human Relations Program: A Study in the Institutionalization of Social Change. Volume II. Appendixes A - G.
Final technical rept. 1 Apr 70-30 Jun 73.
1 Jul 75, 358p Rept no. AIR-20000-7/75-FTR-Vol-2
Contract N00014-70-C-0267
See also Volume 1 dated 1 Jul 75, AD-A012 832, and Volume 3 dated 1 Jul 75, AD-A016 982.

Descriptors: *Human relations, *Teaching methods, Training, Race relations, Attitudes(Psychology), Behavior, Instructors, Problem solving, Assessment, Marine Corps, Questionnaires.
Identifiers: Social change.

The report includes presentations, questionnaires, and survey questions.

AD-A016 982/1GA PC$15.25/MF$2.25
American Institutes for Research Washington D C International Research Inst

The Marine Corps Human Relations Program: A Study in the Institutionalization of Social Change. Volume III. Appendixes H through M.
1 Jul 75, 616p Rept no. AIR-20000-7/75-FTR-Vol-3
Contract N00014-70-C-0267
See also Volume 2 dated 1 Jul 75, and Volume 4 dated 1 Jul 75, AD-A016 983.

Descriptors: *Human relations, *Teaching methods, Training, Race relations, Attitudes(Psychology), Behavior, Instructors, Problem solving, Assessment, Marine Corps.
Identifiers: Social change.

This manual has been developed for use by commanding officers when conducting human relations training. It is to be used for those discussion groups that are participating in their initial 20 hours of human relations training.

AD-A016 983/9GA PC$12.25/MF$2.25
American Institutes for Research Washington D C International Research Inst
The Marine Corps Human Relations Program: A Study in the Institutionalization of Social Change. Volume IV. Appendixes N through OO.
Final technical rept. 1 Apr 70-30 Jun 73.
1 Jul 75, 512p Rept no. AIR-20000-7/75-Vol-4
Contract N00014-70-C-0267
See also Volume 3 dated 1 Jul 75, AD-A016 982.

Descriptors: *Human relations, *Teaching methods, Training, Race relations, Attitudes(Psychology), Behavior, Instructors, Problem solving, Assessment, Marine Corps, Questionnaires.
Identifiers: Social change.

The course of instruction is designed to train students in the organization and maintenance of the USMC Human Relations Program at all levels in the Marine Corps. The course encompasses philosophy, minority-majority issues, culture shock, and selected readings in the field of human relations. Emphasis is also placed on techniques of conducting guided discussions, oral and written presentations, conducting research, interview procedures, and research and implementation of Action Program. Upon completion of this course of instruction the graduating student is able to orient commanders, train and advise discussion leaders, maintain records and implement, conduct and monitor the Human Relations Program effort of the command.

COM-75-11425/6GA PC$5.75/MF$2.25
National Oceanic and Atmospheric Administration, Washington, D.C. Federal Coordinator for Meteorological Services and Supporting Research.
A Federal Plan for Natural Disaster Warning and Preparedness.
Jun 73, 140p NOAA-75100301
See also report dated Jun 75, COM-75-11426.

Descriptors: *Disasters, *Planning, *Warning systems, Readiness, Government policies, National government, Storms, Earthquakes, Volcanoes, Tornadoes, Hurricanes, Floods, Flood forecasting, Weather forecasting, Tsunamis, Droughts, Storm surges, Ice, Avalanches, Landslides, Cost estimates.

This report is addressed to programs that relate to natural disasters caused by geophysical phenomena. Discussed are the functions of environmental monitoring, warning preparation and warning dissemination; community preparedness; and needs versus programmed actions, costs and benefits.

COM-75-11426/4GA PC$5.25/MF$2.25
National Oceanic and Atmospheric Administration, Washington, D.C. Federal Coordinator for Meteorological Services and Supporting Research.
A Federal Plan for Natural Disaster Warning and Preparedness. Supplement No. 1, Fiscal 1976-1980.
Jun 75, 107p NOAA-75082038
See also report dated Jun 73, COM-75-11425.

Descriptors: *Disasters, *Planning, *Warning systems, Readiness, Government policies, National government, Storms, Tropical cyclones, Tornadoes, Floods, Frost action, Droughts, Earthquakes, Tsunamis, Storm surges, Landslides, Avalanches, Volcanoes, Monitoring, Weather modification, Supplements.

The Federal Plan for Natural Disaster Warning and Preparedness, June 1973, presented the Federal action programs and plans for fiscal years 1973-78 to satisfy the unmet needs in the existing natural disaster warning system and community preparedness programs. This first supplement to the Plan examines the recent performance of the disaster warning system, reports the progress made toward improving the warning system and community preparedness program, and updates the action plans of the ten participating Federal agencies for fiscal years 1975-80 to satisfy identified needs.

COM-75-50553/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Technology as a Deterrent to Dehumanization.
Final rept.,
Ruth M. Davis. 30 Aug 74, 1p
Pub. in Science, v185 p737, 30 Aug 74.

Descriptors: *Computers, *Psychological effects, *Technology.
Identifiers: *Dehumanization, Reprints.

The editorial discusses the role of technology as one of the better deterrents to dehumanization. It cites the confusion surrounding the use of the newer technologies of computers, automation and communication in terms of their benefits or disadvantages to the public. It highlights the need for better scientific advice in these areas to senior policy makers.

N75-31919/4GA PC$11.25/MF$2.25
Toledo Univ., Ohio.
The Total Assessment Profile, Volume 1.
G. Leininger, S. Jutila, J. King, W. Muraco, and J. Hansell. Aug 75, 427p NASA-CR-134863
Contract NAS3-17826

Descriptors: *Cost effectiveness, *Economic analysis, *Social factors, *Technology assessment, Disasters, Management planning, Market research, Stress analysis.

For abstract, see STAR 1322

N75-31920/2GA PC$7.50/MF$2.25
Toledo Univ., Ohio.
The Total Assessment Profile, Volume 2.
G. Leininger, S. Jutila, J. King, W. Muraco, and J. Hansell. Aug 75, 232p NASA-CR-134863
Contract NAS3-17826

Descriptors: *Cost effectiveness, *Economic analysis, *Social factors, *Technology assessment, Bibliographies, Finance, Numerical analysis, Product development, Regional planning.

For abstract, see STAR 1322

PB-243 351/4GA PC$9.50/MF$2.25
Elderly Systems, Inc., Cambridge, Mass.
Welfare of the Elderly. Volume II.
Final rept.,
W. Kip Viscusi, and Richard Zeckhauser. Sep 74, 327p*
Grant HEW-92-P-66984/1-01
See also Volume 1, PB-245 350.

Descriptors: *Social welfare, *Elderly persons, *Planning, Demographic surveys, Statistical data, Income, Employment, Social security, Savings, Minority groups, Ethnic groups, Pensions, Discrimination, Policies.

Volume Two of a two-part report on planning for the social welfare of elderly persons contains a survey of income sources, employment programs, collective savings schemes, and policies, including discrimination, minority group aspects, and problems. Portions of this document are not fully legible.

PB-245 138/3GA PC$4.75/MF$2.25
Indiana Univ., Bloomington. School of Public and Environmental Affairs.
Sentencing Alcohol-Related Cases: Options via Judicial Education.
Gary J. Scrimgeour. 1974, 80p* NIAAA/NCALI-75-26

Descriptors: *Alcoholism, Law(Jurisprudence), Crimes, Juvenile delinquency, Law enforcement, Project planning, Education, Rehabilitation, Courts of law, Recidivism.
Identifiers: Judicial seminars, Judges, Drunken driving.

An analysis of the problems faced by judges in dealing with alcoholism cases and suggestions for educational strategies to alleviate them are the subject of this report. The report begins by analyzing various types of alcoholism cases as seen by the courts, such as drunken driving, public drunkenness, and violent crimes. Further discussion is made of the structure of the court system, existing educational facilities ongoing within the judicial system, and ways to utilize these existing resources. Also reviewed are public and private funding sources for both local and national programs.

PB-245 255/5GA PC$8.50/MF$2.25
National League of Cities, Washington, D.C. Urban Observatory Program.
The Quality of Life in Eight American Cities: Selected Indicators of Urban Conditions and Trends.
Final rept.,
Robert Ontell. Mar 75, 265p* UO-LCCM-75-005
Contract HUD-H-987

Descriptors: *Quality of life, *Urban areas, Valves, Requirements, Statistical analysis, Income, Education, Family relations, Residential buildings, Social services, New Mexico, Georgia, Colorado, Missouri, Kansas, Wisconsin, Tennessee, California.
Identifiers: *Social indicators, Albuquerque(New Mexico), Atlanta(Georgia), Denver(Colorado), Kansas City(Missouri), Kansas City(Kansas), Milwaukee(Wisconsin), Nashville(Tennessee), San Diego(California).

The report summarizes the results of a comparative research study of social indicators carried out in eight participating Urban Observatories. It provides an historical overview and theoretical discussion of the principal issues involved in social indicators research, reporting, and monitoring, as well as a discussion of the development and application of specific measures of social conditions in the six domains-income and employment, health, education, public safety, housing, and air pollution-selected for investigation.

PB-245 267/0GA PC$9.25/MF$2.25
Midwest Research Inst., Kansas City, Mo.
Quality of Life Indicators in U.S. Metropolitan Areas, 1970. A Comprehensive Assessment.
Final rept.,
Ben-Chieh Liu. May 75, 323p* EPA/600/5-75/016
Contract EPA-R-803049

Descriptors: *Quality of life, *Urban areas, Requirements, Values, Socioeconomic status, Ranking, Statistical analysis.
Identifiers: *Social indicators, Standard metropolitan statistical areas.

The primary objective of this study is to quantitatively assess the urban quality of life (QOL) and to analyze the variations in the QOL components in the 243 SMSA's in the U.S. This study develops a systematic methodology for constructing economic, political environmental, health and education, and social indicators to reflect the overall 'health' of the nation and its citizens' well-being. These five QOL components consist of some 123 factors which were selected to reflect the essential physical inputs in the QOL. Primary and secondary statistical data for 1970 were collected, reorganized and modified to represent the 123 QOL factor inputs employed in the methodology to derive the QOL component indexes. For analytical purposes, the 243 SMSA's were divided into three population groups--65 large SMSA's (with populations larger than 500,000); 83 medium SMSA's (200,000 to 500,000); and 95 small SMSA's (less than 200,000). The SMSA's in each population group were rated outstanding (A), excellent (B), good (C), adequate (D), or substandard (E) separately for each component on the basis of their QOL index values relative to the respective group means. A static, descriptive analysis of the empirical results was performed, and important findings and relevant policy implications were delineated.

PB-245 273/8GA PC$7.00/MF$2.25
National League of Cities, Washington, D.C. Urban Observatory Program.
Structuring the Search for Local Housing and Community Development Policy.
Final rept.,
William G. Grigsby, Sammis B. White, Daniel U. Levine, Regina M. Kelly, and Marsha Reines Perelman. Oct 74, 199p UO-LCCM-74-004
Contract HUD-H-987

Descriptors: *Housing planning, *Policies, *Urban areas, Municipalities, Surveys, Economic factors, Housing studies, Grants, Income, Socioeconomic status, Demography, Social welfare, Management, Community development, Quality of life, Guidelines, Recommendations, Neighborhoods, Employment, Ethnic groups.
Identifiers: Subsidy programs, Low income families, Moderate income families.

This report is the synthesis of housing policies studies in five Observatory cities. An explanation of the nomenclature currently used in housing economics is followed by an analysis of housing decay, filtering, and abandonment. Several popular arguments for the subsidized dispersal of low- and moderate-income families are discussed, including the need for population, employment, racial, and socioeconomic balance. The report concludes by calling for the development of improved policymaking processes at the local level.

PB-245 276/1GA PC$5.75/MF$2.25
Harvard-MIT Joint Center for Urban Studies, Cambridge, Mass.
Implications for a Direct Cash Assistance Program for Housing: An Analysis of Census Data and Welfare Program Experience.
Final rept.,
Arthur P. Solomon. Jun 75, 133p
Contract HUD-H-1876

Descriptors: *Federal assistance programs, *Cash basis, *Housing planning, Residential buildings, Objectives, Transferring, Surveys, Benefit cost analysis, Management engineering, Classifications, Simulation, Problem solving.
Identifiers: Eligibility, Cash assistance.

As complementary to the Experimental Housing Allowance program, this study focused on a select number of program design issues that would be encountered if a direct cash assistance program were enacted. The research concentrated on the experience of the public assistance program and an analysis of available non-experimental data. The first section of the report examines the choice of eligible population, the payment benefit system, and methods for integrating housing allowances into the existing network of transfer programs. The second section assesses a number of administrative issues, especially the transferability of experience from various transfer programs. The final section presents the findings from both static and simulation analyses of the housing market effects of various rent-and-income-conditioned housing allowance payment plans.

PB-245 334/8GA PC$5.75/MF$2.25
Urban Associates, Inc., Arlington, Va.
A Study of Selected Socio-Economic Characteristics of Ethnic Minorities Based on the 1970 Census. Volume I: Americans of Spanish Origin.
Rept. for Jun 72-Sep 74.
Jul 74, 148p HEW/OS-75-120, ASPE-74-2-1
Contract HEW-OS-72-209
Paper copy also available in set of 4 reports as PB-245 333-SET, PC$18.00.

Descriptors: *Socioeconomic status, *Demographic surveys, *Minority groups, Social welfare, Constraints, United States, Regions, Statistical data, Census, Migrations, Populations, Family relations, Education, Employment, Income.
Identifiers: Mexican Americans, Puerto Ricans, Cubans, Immigration, Poverty, Spanish surname Americans.

This report is a four-volume study of the major barriers to culturally relevant delivery of DHEW services to persons of major ethnic minority origins. Analysis is conducted along national and local levels and incorporates the following characteristics: immigration and in-migration, population, family, education, employment, income, and poverty. All data are summarized in tabular and chart form. Volume 1 highlights Americans of Spanish origin (Mexican Americans, Puerto Ricans and Cubans).

PB-245 335/5GA PC$7.00/MF$2.25
URBAN Associates, Inc., Arlington, Va.
A Study of Selected Socio-Economic Characteristics of Ethnic Minorities Based on the 1970 Census. Volume II: Asian Americans.
Rept. for Jun 72-Sep 74.
Jul 74, 191p HEW/OS-75-121, ASPE-74-2-2
Contract HEW-OS-72-209
Paper copy also available in set of 4 reports as PB-245 333-SET, PC$18.00.

Descriptors: *Socioeconomic status, *Minority groups, *Demographic surveys, Social welfare, Constraints, United States, Regions, Statistical data, Migrations, Populations, Family relations, Education, Employment, Income, Census.
Identifiers: Japanese Americans, Chinese Americans, Korean Americans, Hawaiians, Asian Americans, Poverty.

Volume 2 of a four-volume study of the major barriers to culturally relevant delivery of DHEW services to persons of major ethnic minority origins. Focuses on Asian Americans (Japanese, Chinese, Philipinos, Koreans, and Hawaiians).

PB-245 336/3GA PC$5.25/MF$2.25
Urban Associates, Inc., Arlington, Va.
A Study of Selected Socio-Economic Characteristics of Ethnic Minorities Based on the 1970 Census. Volume III: American Indians.
Rept. for Jun 72-Sep 74.
Jul 74, 114p HEW/OS-75-122, ASPE-74-2-3
Contract HEW-OS-72-209
Paper copy also available in set of 4 reports as PB-245 333-SET, PC$18.00.

Descriptors: *Socioeconomic status, *Minority groups, *Demographic surveys, Social welfare, Constraints, United States, Regions, American Indians, Statistical data, Migrations, Populations, Family relations, Census, Education, Employment, Income.
Identifiers: Poverty.

This report is a four-volume study of the major barriers to culturally relevant delivery of DHEW services to persons of major ethnic minority origins. Studies on the American Indian, Eskimo, and Aleuts are found in volume 3. Analysis is conducted along national and local levels and incorporates the following characteristics: immigration and in-migration, population, family, education, employment, income, and poverty. All data are summarized in tabular and chart form.

PB-245 337/1GA PC$3.75/MF$2.25
Urban Associates, Inc., Arlington, Va.
A Study of Selected Socio-Economic Characteristics of Ethnic Minorities Based on the 1970 Census. Volume IV: HEW Regional Data.
Rept. for Jun 72-Sep 74.
Jul 74, 34p HEW/OS-75-123, ASPE-74-2-4
Contract HEW-OS-72-209
Paper copy also available in set of 4 reports as PB-245 333-SET, PC$18.00.

Descriptors: *Socioeconomic status, *Minority groups, *Demographic surveys, Social welfare, Constraints, United States, Regions, Statistical data, Summarizing, Ethnic groups, Negroes, Migrations, Populations, Family relations, Education, Employment, Income, Census.
Identifiers: Mexican Americans, Puerto Ricans, Cubans, Spanish surname Americans, Japanese Americans, Chinese Americans, Philipinos, Korean Americans, Hawaiians, Eskimos, Aleuts, Poverty.

Volume Four of a four-volume study of major barriers to the culturally relevant delivery of DHEW services to persons of major ethnic minority origin summarizes the findings of the 3 preceding volumes in tabular and chart form. The analysis covers immigration and in-migration, population, family, education, employment, income, and poverty.

PB-245 338/9GA PC$6.00/MF$6.00
Urban Inst., Washington, D.C.
Design of an On-Site Evaluation System for the Office of Legal Services,
Hugh G. Duffy, John W. Scanlon, Leona M. Vogt, Bayla F. White, and Joseph S. Wholey.
Jun 71, 127p* URI-50007, UI-502-1
Sponsored by Office of Economic Opportunity, Washington, D.C.

Descriptors: *Law(Jurisprudence), *Services, Performance evaluation, Litigation, Project planning, Project management, Quality, Financing, Effectiveness.
Identifiers: Legal services, Poverty groups.

The study describes an operational evaluation system designed by the Institute for the use of OEO's Office of Legal Services in planning and managing the national legal service program. The system was used to evaluate every Legal Services project in the country, subjecting them to closer and more uniform scrutiny than before the system was introduced.

PB-245 350/4GA PC$10.00/MF$2.25
Elderly Systems, Inc., Cambridge, Mass.
Welfare of the Elderly. Volume I.
Final rept.,
W. Kip Viscusi, and Richard Zeckhauser. Sep 74, 364p*

Grant HEW-92-P-66984/1-01
See also Volume 2, PB-245 351.

Descriptors: *Social welfare, *Elderly persons, *Planning, Demographic surveys, Statistical data, Cash basis, Services, Income, Employment, Social security, Policies, Minority groups, Methodology, Economic factors, Social change, Family relations, Capital, Savings.
Identifiers: Personal stocks.

The purpose of this report is threefold: First, it presents and analyzes data pertaining to the economic status of being aged. Second, it constructs an analytic framework by which one can examine policy toward the elderly. Third, the analysis serves as a paradigm for policy analyses in other fields. Volume One deals with the need for assistance, how to help the elderly, income, services, employment, savings, and policies for the elderly. Portions of this document are not fully legible.

PB-245 657/2GA PC$3.75/MF$2.25
Tri-State Regional Planning Commission, New York.
Annual Regional Report, 1974.
Mar 75, 38p TSRPC-3734
See also PB-212 452.

Descriptors: *Demographic surveys, *Regional planning, *Connecticut, *New Jersey, *New York, Birth, Employment, Population migrations, Income, Waste disposal, Land development, Urban planning, Travel demand.
Identifiers: DOT/1B.

The study reports that birth rates are lower than ever, employment is at a standstill, migration to the Region from elsewhere in the country has slowed to the point--where for the first time in 1972--more people left than entered, and the ratio of family incomes has been sliding despite modest improvements in other areas. These indicators are perhaps the most challenging that the Region has ever confronted and the Commission views them as the signal of a basic shift toward a much more stable situation that calls for a different type of planning than has taken place in the past. It sees this period as a time to conserve, not expand; to rehabilitate, not build and to repair rather than replace, if possible.

PB-245 661/4GA PC$3.25/MF$2.25
Tri-State Regional Planning Commission, New York.
Regional Profile. Regional Migration, 1970. Volume II. Number 7.
Regional profile rept.
Apr 75, 19p TS-8021
See also report dated Jul 73, PB-222 702.

Descriptors: *Census, *Regional planning, *New York, *New Jersey, *Connecticut, Population migrations, Statistical analysis.

Although Tri-State residents relocate rather frequently--85.2 percent since 1950--only 8.6 percent of the Region's total population moved before 1950. After 1965 however, 47.8 percent of the Region's 7,451,000 residents five years and older changed their addresses: 43.4 percent moved within the same subregion; 20.8 percent moved from a different subregion in the same state; and 11.3 percent moved from one state to another. Of the 18,724,940 total regional residents in 1970, 6.2 percent had never moved. Central Naugatuck, Brooklyn and Passaic were the highest nonmover areas, while Housatonic Valley, Rockland, Monmouth and Manhattan were reported to have the lowest percentage of nonmovers.

PB-245 735/6GA PC$6.25/MF$2.25
Atlanta Urban Observatory, Ga.
Housing in Atlanta: Toward Neighborhood Investment by Residents. A Report for the City of Atlanta and The Atlanta Urban Observatory.
Final rept.,
Larry L. Earvin, and Bruce B. Gruber. Feb 75, 175p UO-LCCM-ATL-75-009
Contract HUD-H-987

Descriptors: *Housing studies, *Georgia, Quality, Neighborhoods, Community development, Residential buildings, Urban renewal, Recommendations, Environments, Policies, Demography, Interviews, Project planning.
Identifiers: *Atlanta(Georgia).

This study examines Atlanta's past housing activities and suggests ways to improve the quality of the housing stock and to increase residential options. It emphasizes the importance of the neighborhood environment in improving housing opportunities and recommends that the city commit itself to the revitalization of neighborhoods by adopting policies that encourage property investment by residents.

PB-245 815/6GA PC$4.25/MF$2.25
Department of Housing and Urban Development, Washington, D.C. Policy Development and Research.
Initial Impressions and Findings of the Interim Report of the Experimental Housing Allowance Program.
Interim rept.
May 75, 55p
See also PB-242 031.

Descriptors: *Federal assistance programs, *Housing studies, Project management, Low income groups.
Identifiers: *Housing allowance programs, Household characteristics, Cash assistance.

The report contains initial impressions and findings based on early experience from the Experimental Housing Allowance Program. It focuses on two major topics: the first concerns basic information on the more than 10,000 households that have received direct cash assistance from the Experimental Housing Allowance Program; the second deals with findings on the initial processes involved in the administration of a direct cash assistance program for housing. The information now available on households participating in the program describes the characteristics of those households before they received program benefits (baseline). Data on how these participant households used their program benefits have yet to be analyzed or in some cases, collected. The discussion of administrative processes describes the functions that a housing allowance agency must perform before making payments to participating households.

PB-245 819/8GA PC$5.75/MF$2.25
Research Triangle Inst., Research Triangle Park, N.C. Engineering Div.
Pilot Program for Monitoring and Evaluation the Public Inebriate Program. Volume I: Program Analysis.
Final rept.,
D. C. Jones, and R. N. Hendry. Jan 74, 139p RTI-43U-759-Vol-1 NIAAA-72-34-1
Contract HSM-42-72-203
Paper copy also available in set of 3 reports as PB-245 818-SET, PC$15.00.

Descriptors: *Alcoholism, *Rehabilitation, Project management, Evaluation, Records management, Systems analysis.
Identifiers: Public inebriate program.

The summary report consists of three volumes. Volume I presents the goals of the PIP program, the measures established to record progress towards those goals, and an analysis of the program. Copies of the preliminary forms and procedures adopted to implement the system are also shown.

PB-245 820/6GA PC$4.75/MF$2.25
Research Triangle Inst., Research Triangle Park, N.C. Engineering Div.
Pilot Program for Monitoring and Evaluation the Public Inebriate Program. Volume II: Data Processing System.
Final rept.,
R. N. Hendry, and S. G. Nicholas. Jan 74, 91p RTI-43U-759-Vol-2 NIAAA-72-34-2
Contract HSM-42-72-203
Paper copy also available in set of 3 reports as PB-245 818-SET, PC$15.00.

Descriptors: *Alcoholism, *Rehabilitation, Evaluation, Project management, Records management, Systems analysis, Data processing.
Identifiers: Public inebriate program.

The summary report consists of three volumes. Volume II contains a description of the data processing system and recommendations relating to both data collection and data processing. Definitions for terms used are given in Appendix A. Copies of the preliminary forms and procedures adopted to implement the system are also shown.

PB-245 821/4GA PC$7.25/MF$2.25
Research Triangle Inst., Research Triangle Park, N.C. Engineering Div.
Pilot Program for Monitoring and Evaluating the Public Inebriate Program. Volume III. Procedures Manual.
Final rept.,
R. N. Hendry, S. G. Nicholas, and D. B. Wilderson. Jan 74, 212p RTI-43U-759-Vol-3 NIAAA-72-34-3
Contract HSM-42-72-203
Paper copy also available in set of 3 reports as PB-245 818-SET, PC$15.00.

Descriptors: *Alcoholism, *Rehabilitation, Evaluation, Project management, Records management, Systems analysis, Manuals.
Identifiers: Public inebriate program.

The summary report consists of three volumes. Volume III contains the procedures manual, which describes instructions provided to the centers to guide data collection operations. Copies of the preliminary forms and procedures adopted to implement the system are also shown.

PB-246 089/7GA PC$4.75/MF$2.25
Stanford Research Inst., Menlo Park, Calif.
Proposed Model for Monitoring and Evaluating the Operation of Ten DOT/NIAAA Joint Alcoholism Programs.
Interim rept. on Phase 1,
Jean Lipman-Blumen, Robert J. Campana, and Leland H. Towle. Sep 72, 92p SRI-URU-2042 NIAAA/NCALI-75/24
Contract HEW-OS-72-208
See also Phase 2, PB-246 090.

Descriptors: *Alcoholism, *Motor vehicle operators, Project planning, Project management, Rehabilitation, Evaluation, Courts of law, Social services.
Identifiers: Alcohol safety action projects, Driving while intoxicated offenders.

The study develops and implements a uniform system for monitoring and evaluating the effectiveness of Alcohol Safety Action Project and Alcoholism Center referral, treatment, and rehabilitation programs. Critical variations occur in the processing of the DWI, the decision criteria at various process junctures, and the organizational relationships between ASAP/AC and their affiliates. A model designed for monitoring the programs is presented focusing upon: (1) the legal and normative background; (2) the setting, structure, and process of organizations, and (3) the problem populations exposed to different treatment modalities. This

model calls for baseline pretreatment measures as well as posttreatment measures. The need for cooperation and participation by the various ASAP's and AC's, plus their parent organizations, is cited.

PB-246 090/5GA PC$8.50/MF$2.25
Stanford Research Inst., Menlo Park, Calif.
Development of a Pilot Program for Monitoring and Evaluating the Operation of Ten DOT/NIAAA Joint Alcoholism Programs: Evaluation of the ASAP/AC Program.
Final rept. on Phase 2,
J. R. Eagleston, C. H. Rittenhouse, L. H. Towle, and V. K. Wiegand. Sep 74, 274p SRI-URU-2042-FR NIAAA/NCALI-75/22
Contract HEW-OS-72-208
See also Phase 1, PB-246 089.

Descriptors: *Alcoholism, *Motor vehicle operators, Project management, Rehabilitation, Evaluation, Courts of law, Social services.
Identifiers: Alcohol safety action projects, Driving while intoxicated offenders.

The results of final analysis and evaluation of ten Alcohol Safety Action Project (ASAP)/Alcoholism Center (AC) Projects jointly funded by Department of Transportation and DHEW (NIAAA) and of a pilot program monitoring system developed and implemented by the Stanford Research Institute are reported. The data indicate that the ASAP/AC's are a highly productive mechanism for intervention into alcohol problems and treatment of alcohol abusers and problem drinkers. More specifically, DWI's with a drinking problem seem to be reached earlier in their drinking milieu than their non-DWI client counterparts. They receive more low-cost outpatient treatment, and they stay under treatment longer. Moreover, treatment outcome based on client turnover six months after intake seems much more favorable for DWI than for non-DWI cases. The great variability of ASAP and judicial procedures at the different sites is noted, and the paucity of data specific to ASAP processing of DWI's decried.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A016 547/2GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Effect of Infection with Gonococci on Myeloperoxidase Activity of Leucocytes.
Medical research progress rept.,
Warren W. Schultz, and David W. Thomas. 9 Sep 74, 8p
Availability: Pub. in British Jnl. of Venereal Diseases, v51 n3 p170-173 1975.

Descriptors: *Leukocytes, *Phagocytes, *Neisseria gonorrhoeae, Peroxidases, Biological products, Stimulation(Physiology), Strains(Biology), Virulence, Infections, Humans, Iodides, Radioactive isotopes, Heating, Immunoglobulins, Reprints.
Identifiers: Myeloperoxidase, Lyosomal enzymes.

Lyosomal myeloperoxidase activity in human phagocytic leucocytes was stimulated by incubation with virulent (Type 1) and avirulent (Type 4) forms of Neisseria gonorrhoeae. The amount of activity, assayed by bacterial iodination (I 125) after 30-minute exposure to phagocytes in the absence of serum, was about fifty times greater in cells infected with Type 4 strains. In the presence of heated human serum, or its IgG component, myeloperoxidase activity increased, but Type 1-stimulated activity was significantly less than that of Type 4 and was not proportional to multiplicity of infection. It is concluded that Type 1 can stimulate leucocyte myeloperoxidase activity from an extracellular location; that for this activity a serum fraction is required; and that this may be a mechanism responsible for some of the killing of the membrane associated Type 1.

AD-A016 646/2GA PC$3.25/MF$2.25
Illinois Univ At Urbana-Champaign
Water Proton Relaxation as a Monitor of Membrane-Bound Manganese in Spinach Chloroplasts.
Technical rept.,
T. Wydrzynski, N. Zumbulyadis, P. G. Schmidt, and 3 Oct 75, 18p Rept no. TR-7
Contract N00014-75-C-0163

Descriptors: *Chloroplasts, *Membranes, *Manganese, Colloids, Extraction, Oxidizers, Reduction(Chemistry), Paramagnetic materials, Accumulators, Nuclear magnetic resonance.
Identifiers: *Spinach, Spin lattice relaxation, Reducing agents, Nuclear magnetic relaxation.

First measurements of proton relaxation on chloroplast membranes are presented here. Experiments show that the water proton spin-lattice relaxation rate in chloroplast thylakoid membrane suspensions can be used to monitor membrane-bound manganese. The relaxation effect is reduced to 0.4 of its original value upon manganese extraction by washing with either alkaline tris buffer of NH2OH-EDTA solution. Large increases in the proton relaxation rate are measured in the presence of reductants such as tetraphenylboron and NH2Oh; oxidants such as potassium ferricyanide or 2,6-dichlorophenolindophenol lead to a decrease in this rate. These results suggest that manganese exists as a mixture of oxidation states in dark-adapted chloroplasts.

AD-A016 710/6GA PC$3.25/MF$2.25
Letterman Army Inst of Research San Francisco Calif
Determinants of the Renal Clearance of Digoxin.
Final rept.,
H. Halkin, L. B. Sheiner, C. C. Peck, and K. L. Melmon. 18 Nov 74, 13p Rept no. LAIR-75-003
Availability: Pub. in Clinical Pharmacology and Therapeutics, v17 n4 p385-394 Apr 75.

Descriptors: *Digitalis, *Creatinine, *Nitrogen, *Urea, *Kidneys, *Elimination, Drugs, Biochemistry, Correlation techniques, Reprints.
Identifiers: Digoxin.

The renal clearances of digoxin, creatinine, and urea nitrogen were determined simultaneously in each of 41 patients receiving digoxin, in most of whom there was prerenal azotemia. Mean + or - SD values were: blood urea nitrogen (BUN), 26.1 + or - 12.8 mg per 100 ml; creatinine, 1.1 + or - 0.41 mg per 100 ml; creatinine clearance, 78 + or - 42 ml/min/1.73sq m; digoxin clearance, 66.6 + or - 42.1ml/min/1.73 sq m; urea nitrogen clearance, 27.8 + or - 19.2 ml/min/1.73 sq. m. Correlation analysis revealed that urea clearance is superior to creatinine clearance, and BUN is superior to serum creatinine concentration in the degree of relationship to renal digoxin clearance. Moreover, using partial correlation techniques, it is apparent that in these patients digoxin clearance was significantly related to urine flow rate independent of creatinine clearance, and to urea nitrogen clearance independent of both creatinine clearance and urine flow rate. These findings are compatible with the hypothesis that digoxin undergoes some degree of tubular reabsorption as well as filtration and secretion. (Author)

AD-A016 742/9GA PC$3.25/MF$2.25
Indian Inst of Science Bangalore Dept of Biochemistry
Inhibitory Action of Norepinephrine on the Induction of Tryptophan-2,3-Dioxygenase by Cortisol: Mediation by the Alpha-Receptor.
V. Sitaramam, and T. Ramasarma. 9 Apr 75, 6p
Contract N00014-71-C-0348
Availability: Pub. in Life Sciences, v16 n9 P1387-1392 1975.

Descriptors: *Tryptophan, *Cortisol, *Inhibition, *Enzymes, Rats, Interactions, Reprints.
Identifiers: Norepinephrine.

Induction of hepatic tryptophan-2,3-dioxygenase in rats by cortisol or corticosterone was inhibited on treatment with norepinephrine. The beta-adrenergic blockers showed a small potentiating effect of the norepinephrine-mediated inhibition. The alpha-adrenergic blockers significantly reversed this inhibition, suggesting that norepinephrine acts via the alpha-receptor in inhibition of the cortisol-mediated induction of this enzyme. (Author)

AD-A016 963/1GA PC$4.25/MF$2.25
Battelle Columbus Labs Ohio
Investigation of Immobilized Enzymes for Hydrolysis of Glucuronides in Urine.
Final rept.,
David J. Fink, Melody K. Bean, and Richard D. Falb. 14 Oct 75, 51p
Contract DAMD17-74-C-4091
See also report dated 4 Feb 75, AD/A-005 660.

Descriptors: *Enzymes, Hydrolysis, Assaying, Test methods, Drugs, Detection, Morphine, Urine.
Identifiers: *Immobilized enzymes, *Glucuronides, *Glucuronidase, Glucuronic acid, Urinalysis.

Metabolism of certain drugs leads to the formation of conjugation products with glucuronic acid prior to excretion in urine. Thus, heroin is converted to morphine, which after conjugation with glucuronic acid, appears in the urine as morphine glucuronide. Detection systems for drug glucuronide products can be improved if the glucuronide is hydrolyzed as a first step in the system. The report contains the results of an investigation of immobilized beta-glucuronidase to hydrolyze urinary glucuronides such as morphine-3-glucuronide. beta-glucuronidases from three sources were immobilized on porous glass beads and CNBr-activated sepharose. The activity of the soluble and immobilized enzymes was determined in batch assays using phenolphthalein glucuronide and p-nitrophenyl glucuronide. The enzymatic activity, stability, and effect of pH on beta-glucuronidase columns were determined at 37C using p-nitrophenyl glucuronide and morphine glucuronide as substrates. The efficacy of hydrolyzing morphine glucuronide in urine by columns of immobilized beta-glucuronidase was also investigated.

N75-31708/1GA PC$3.25/MF$2.25
Agnew Tech-Tran, Inc., Woodland Hills, Calif.
Biochemistry: Investigation of the Polyphosphate-Synthetase of Saccharomyces Cerevisiae.
S. Felter, and A. Stahl. Aug 75, 9p NASA-TT-F-16497
Contract NASW-2789
Tran-Transl. Into English from C. R. Acad., Sci. (Paris), V. 280, 28 Apr. 1975 p 1903-1906.

Descriptors: *Biochemistry, *Biosynthesis, *Saccharomyces, Enzymes, Phosphates.
Identifiers: Translations.

For abstract, see STAR 1322

PB-245 124/3GA PC$3.75/MF$2.25
Wisconsin Univ., Madison. Dept. of Biochemistry.

Preparation of Vitamin D Metabolites and Analogs for Clinical Evaluation in Diseases of Bone.
Annual rept. Apr 74-Jun 75,
Hector F. DeLuca, and Heinrich K. Schnoes. 15 Jul 75, 29p AK-2-72-2226
Contract PHS-72-2226
See also PB-233 606.

Descriptors: *Vitamin D group, Metabolism, Synthesis(Chemistry), Cholesterol, Steroids, Experimental data.
Identifiers: *Metabolites, Cholecaliferol/hydroxy, Cholesterol/dihydroxy, *Cholecaliferols.

A synthesis of 1 alpha-hydroxyergocalciferol, a highly potent analog of vitamin D2 is described. The compound is available from ergosterol in nine steps. A somewhat modified route to 3-deoxy-1 alpha-hydroxyvitamin D3 which avoids some of the low yield steps of an earlier synthesis is reported. A number of steroid intermediates suitable for conversion to vitamins or vitamin analogs and for the introduction of radiolabel if desired have been prepared.

PB-245 697/8GA Not available NTIS
Skidaway Inst. of Oceanography, Savannah, Ga.
Occurrence of Cellulase Activity in the Stomachs of Fishes,
Robert R. Stickney, and Sandra E. Shumway. 21 Feb 74, 13p NSF/IDOE-75-30
Grants NSF-GS-33615, NSF-GD-37558
Pub. in Jnl. Fish Biol., v6 p779-790 1974.

Descriptors: *Fishes, *Cellulase, Catfishes, Stomach, Gastrointestinal system, Enzymes, Glycoside hydrolases, Viscometry, Aquatic biology, Food habits, Marine fishes, Southeast Region(United States).
Identifiers: Elasmobranches, Ictalurus punctatus, Teleostes.

The studies outlined in this paper were designed to determine the incidence of occurrence of cellulase activity in the stomachs of common species of southeastern United States marine and estuarine teleost and elasmobranch fishes, and to determine if the presence or absence of cellulase activity could be related to general food habits of the fish examined. The stomachs of 148 elasmobranch and teleost fishes representing 35 families and 62 species were examined by viscometry for cellulase activity. Sixteen species of Georgia estuarine fish and the freshwater fish, Ictalurus punctatus (Rafinesque) showed some cellulase activity. Elasmobranchs and teleosts captured in Florida Bay, Florida, and over the continental shelf off Georgia lacked cellulase activity. The results indicated that replicate examinations yielded the same results within species, although not necessarily between species exhibiting similar food habits and the presence of cellulase activity in starved but not in antibiotically treated catfish.

6C. Biology

AD-A016 658/7GA PC$3.25/MF$2.25
North Carolina State Univ Raleigh Dept of Entomology
Ultrastructure of Arthropod Sensory Structures.
Final rept. 1 Jan 70-30 Sep 75,
Richard C. Axtell. 24 Oct 75, 14p
Contract N00014-70-A-0120-0001

Descriptors: *Arthropoda, *Senses(Physiology), *Insects, Morphology(Biology), Electron microscopy, Ticks, Mites, Diptera, Larvae, Entomology.

The report summarizes research in the sensory structure and related selected organ system of ticks, mites and fly larva. Scanning and transmission electron microscopy are utilized. A list of publications is given with an abstract for each journal publication.

AD-A016 973/0GA PC$3.75/MF$2.25
Wisconsin Univ Madison Dept of Entomology
Human Biting Activity by Rain Forest Culicoides.
Final technical rept. 1 Dec 73-30 Nov 74,
Gene R. DeFoliart. 27 May 75, 44p
Contract DAMD17-74-C-4048

Descriptors: *Culicoides, *Ecology, *Bites and stings, Insects, Arthropoda, Diptera, Entomology, Seasonal variations, Distribution, Rainfall, Forests, Diurnal variations, Colombia, South America.
Identifiers: Culicoides pseudodiabolicus, Culicoides gabaldoni, Rain forests.

The temporal, spatial and seasonal distribution of biting activity of anthropophilic Culicoides (Diptera:Ceratopogonidae) was studied in cleared and forested areas near Providencia, Colombia. A total of 21, 188 specimens were collected, comprising 54 species. Culicoides pseudodiabolicus was the predominant species in both forest and cleared areas, accounting for 86.1% of the specimens collected. Its greatest abundance was during the wet season, its biting activity was mainly nocturnal and it exhibited some arboreal preference. The second most abundant forest species was C. gabaldoni which accounted for 7.1% of the specimens in the forest catches. It is diurnal with maximum biting between 1200 and 1600 hours, arboreal, and present throughout the year although populations were somewhat reduced toward the end of the dry season. In clearings, diurnal biting activity was almost negligible but at night activity became comparable to that in the forest.

COM-75-11414/0GA PC$3.25/MF$2.25
Massachusetts Div. of Fisheries and Game, Boston.
Hatchery Modification for Hatching and Rearing Atlantic Salmon.
Completion rept. Jun 73-Jun 74,
Colton H. Bridges. Feb 75, 11p NOAA-75091708
Grant NOAA-04-3-043-65
Report on Anadromous Fish Conservation Act.

Descriptors: *Salmon, *Fisheries, *Aquaculture, *Connecticut River, Fresh water fishes, Marine fishes, Fishing grounds, Production, Cost estimates, Photographs.

The report describes the Hatchery Modification for Hatching and Rearing Atlantic Salmon Project. The objective of this project was to increase hatchery production capabilities for Atlantic salmon within the Connecticut River Basin. The objective was fulfilled by completing the following two jobs: Job 1, the installation of a hatch house at Sunderland State Fish Hatchery, and Job 2, the improvement of hatching and rearing facilities at the Palmer Experimental Salmon Station. These jobs are described and the financial cost is given. This report also contains pictures of the two facilities.

COM-75-11423/1GA PC$3.25/MF$2.25
Massachusetts Dept. of Natural Resources, Boston. Div. of Marine Fisheries.
Anadromous Fish Development.
Completion rept. 1 Jul 70-30 Jun 74,
Joseph S. DiCarlo. Aug 75, 24p NOAA-75091709
Report on the Anadromous Fish Conservation Act.

Descriptors: *Fishes, *Fisheries, Marine fishes, Fresh water fishes, Animal migrations, Conservation, Massachusetts.
Identifiers: Fish ladders, *Fish passage, *Anadromous fishes, Alewife, Shad, Smelt.

The report is on the Anadromous Fish Development project. Using priorities established in AFC-1 and AFS-3, 14 fishways were constructed, four were improved and another 51 were adjusted and cleaned. A total of 152,950 alewives were stocked in areas where passage improvements were made or are anticipated. Smelt eggs (10,000,000) were planted in Mill Creek, Sandwich. Shad eggs were stocked in the Charles River (3,372,700) and the Taunton River (10,174,300) in an effort to re-establish populations.

COM-75-11427/2GA PC$3.25/MF$2.25
Alabama Dept. of Conservation and Natural Resources, Montgomery.
Experiments in Overwintering Florida Pompano and Winter Culture of Rainbow Trout.
Completion rept. Jul 73-Jun 75,
Walter M. Tatum. Jul 75, 22p NOAA-75092905
Report on Commercial Fisheries Research and Development Act.

Descriptors: *Fishes, *Trout, *Fisheries, Seasonal variations, Abundance, Aquaculture, Experimental data, Marine fishes, Aquatic biology, Temperature, Mexico Gulf.
Identifiers: Rainbow trout, *Trachinotus carolinus, Pompano, Commercial fishing.

The report summarizes work completed during the co-operative agreement period 1 July 1973 to 30 June 1975. Experiments conducted by the Marine Resources Division during the period 1969-1973 indicated good culture potential for Florida pompano (Trachinotus carolinus) along the northern Gulf of Mexico. Good gains can normally be produced on pompano during the period May to October; however, gains are not sufficient to produce commercially marketable pompano (0.45 kg) during one growing season. The background information suggested a need for research in overwintering pompano and to determine the amount of time required to produce marketable size pompano after successful overwintering. Pompano were not overwintered during the initial segment of 2-203-R because of delays in acquiring 3-phase electrical service to run the freshwater well. Experiments during 71-73 indicated not only a good culture potential for rainbow trout in coastal Alabama, but also that faster gains could be produced in brackish water than in fresh water.

COM-75-11430/6GA PC$12.25/MF$2.25
National Marine Fisheries Service, Washington, D.C. Div. of Statistics and Market News.
Fishery Statistics of the United States, 1972.
1972, 525p NOAA-75092903
See also report dated 1971, COM-74-51227.

Descriptors: *Fisheries, *Economic analysis, *International trade, Reviews, Market research, Fishing, Volume, Merchant vessels, Employment, Food consumption, Statistical data, Marine fishes, Shellfish, Tables(Data), United States, Puerto Rico, American Samoa.
Identifiers: *Commercial fishing, Fishing equipment, Fishing products, Fish harvesting.

The report contains a review of the fishery statistics for the year 1972. These statistics include data on the volume and value of landings of fishery products, employment in the fisheries, quantity of gear operated, number of fishing craft employed in the capture of fishery products, information on the volume and value of the production of processed fishery products, data on freezings and cold storage holdings, and on foreign trade in fishery commodities. Data on employment of fishermen, fishing craft and gear in the fisheries, and on the landings of fish, shellfish, and other aquatic plants and animals, are shown for States having commercial fisheries. The commercial fisheries had a harvest of 4.8 billion pounds worth a record $748.0 million--a decline of 212.3 million pounds (4%), but an increase of $97.1 million (15%) compared with 1971.

COM-75-11451/2GA PC$3.25/MF$2.25
Alaska Univ., College. Cooperative Extension Service.
Operation and Construction of the Plumb Staff Beam Trawl,
A. K. Larsson. Jun 75, 22p Marine Advisory Bull-4 NOAA-75100201
Grant NOAA-94-5-158-35

Descriptors: *Fishing, *Nets, *Fishing grounds, Construction, Diagrams, Test methods, Efficiency, Towing.
Identifiers: *Fishing equipment, Sea Grant program, *Trawling.

The report describes a type of fishing gear known as a 'Plumb Staff' type Beam trawl. It differs from the conventional beam trawl in several respects, and mainly so because it employs a detachable beam. Of Japanese origin, the plumb staff trawl was brought from Japan to British Columbia, Canada, several years ago, and has been in use there ever since. The initial test-fishing of these nets was done in Thomas Bay, near Petersburg, Alaska, in August, 1967, using a chartered gillnet boat. Another test was done during the latter part of July, 1968, from a BCF vessel SABLEFISH, stationed in Kasitsna Bay in lower Cook Inlet. Incomplete -too short- as these two test-periods were, the results appear promising. Judging by the numbers of bottom-fishes caught in the test-hauls, a fin-fish trawl of this type should do rather well, especially on flat fishes - flounders and soles. Therefore, a diagram for a fin-fish trawl has also been included in this report.

COM-75-50185-07/GA
PC-GPO/MF$2.25-NTIS
National Marine Fisheries Service, Seattle, Wash.
Marine Fisheries Review. Volume 37, Number 7, July 1975.
Monthly pub.,
Willis L. Hobart. Jul 75, 48p NOAA-75091601
Paper copy available from GPO.

Descriptors: *Marine fishes, *Fisheries, Reviews, Mexico Gulf, Food industry, Shrimps, Economic analysis, Seafood, Fishing, Food processing, Periodicals, Alaska, Texas.
Identifiers: Commercial fishing.

The report contains various articles on Marine fisheries, their products, and information pertinent to the National Marine Fisheries Service. The articles are: (1) Synopsis of the Northern Gulf of Mexico Industrial and Foodfish Industries, (2) Economic Impact of Commercial Shrimp Landings on the Economy of Texas, (3) Vacuum Cooling and Thawing Fishery Products, (4) An Empirical Study of Limited Entry in Alaska's Salmon Fisheries, (5) A New Incubator for Salmonids Designed by Alaska Laboratory. The periodical also contains sections on NOAA/NMFS Developments, Foreign Fishery Developments, Fishery Notes, Publications, and In Brief - dealing with Appointments, Abalones, and Mackerel.

COM-75-50185-07-01/GA
(Order as COM-75-50185-07)
National Marine Fisheries Service, Pascagoula, Miss. Southeast Fisheries Center.
Synopsis of the Northern Gulf of Mexico Industrial and Foodfish Industries,
Elmer J. Gutherz, Gary M. Russell, Anthony F. Serra, and Bennie A. Rohr. Jul 75, 12p Contrib-247 NOAA-75091601-1, MFR-Paper-1149
Included in Marine Fisheries Review, v37 n7 p1-11 Jul 75.

Descriptors: *Fisheries, *Food industry, *Mexico Gulf, Fishing grounds, Equipment, Marine fishes, Trout.
Identifiers: Fishing equipment, Micropogon undulatus, Leiostomus xanthurus, Cynoscion nothus, Cynoscion arenarius.

The article gives a synoptic overview of the industrial groundfish and croaker food-fish industries in the northern Gulf of Mexico. Their histories, fishing grounds, vessels, gear, tactics, and product processing are described for the period 1952 through 1973. The fishing grounds with major species and their contribution to the fishery are discussed. Some of the findings include; that the finfish resource of the northern Gulf of Mexico, dominated by sciaenids (croaker, spot, sea trout) supports two major trawl fisheries. One, initiated in 1952 to produce petfood, has undergone significant changes in vessels, gear, and fishing tactics.

COM-75-50185-07-02/GA
(Order as COM-75-50185-07)
Texas A and M Univ., College Station. Dept. of Agricultural Economics and Rural Sociology.
Economic Impact of Commercial Shrimp Landings on the Economy of Texas,
Wade L. Griffin, and Lonnie L. Jones. Jul 75, 4p NOAA-75091601-2, MFR-Paper-1150
Prepared in cooperation with Texas Agricultural Extension Service, College Station. Also pub. as Texas Agricultural Experiment Station, College Station, Technical Article-11697. Included in Marine Fisheries Review, v37 n7 p12-14 Jul 75.

Descriptors: *Shrimps, *Economic analysis, *Texas, Volume, Statistical data, Fishing, Income, Employment, Demand(Economics), Seafood, Food industry, Surveys.
Identifiers: Commercial fishing, *Fish industry.

The report focuses on the economic contribution that shrimp producers make to Texas in order to evaluate the potential economic value of shrimp production. Some of the findings reported in this article include that the total amount of shrimp landed in Texas in 1971 was 54.2 million pounds with a value of $63.9 million. In total dollars, the estimated direct, indirect, and induced impact on the Texas economy from the $63.9 million of 1971 shrimp was estimated at $197.1 million. The contribution to total economic welfare with respect to personal income was $56.8 million and employment created was 6,083 jobs. About 80% of this aggregate statewide economic impact is concentrated in the Gulf coastal region. Increased demand by various groups for the resources of the Gulf and bays are causing ever-increasing pressure on local, state, and federal agencies for coastal zone management policies. This means that decisions will be handed down by these agencies that will affect the shrimp industry. The author feels that the results of this study shows that the commercial shrimp industry makes an important contribution to the economy of Texas particularly along the coastal region.

COM-75-50185-07-04/GA
(Order as COM-75-50185-07)
Alaska Commercial Fisheries Entry Commission, Juneau.
An Empirical Study of Limited Entry in Alaska's Salmon Fisheries,
James E. Owers. Jul 75, 5p NOAA-75091601-4, MFR-Paper-1152
Included in Marine Fisheries Review, v37 n7 p22-25 Jul 75.

Descriptors: *Salmon, *Fishing, *Alaska, Fisheries, Fishing grounds, Income, Economic surveys, Seafood, Food industry, Licenses, Statistical data.
Identifiers: Commercial fishing, *Fish economics, *Fishing industry.

The report studies and analyzes the question of limited entry, or controlled access, in the Alaskan salmon fisheries. According to the article, the empirical evidence gathered in an analysis of Alaska's salmon fisheries indicates that fishermen's earnings are, in many cases, below opportunity incomes. Furthermore, there is no self-correcting mechanism for assuring adequate incomes as long as a large percentage of fishermen have little economic dependence upon commercial fishing. The data indicate that there are sufficient differences between vocational and others in the fisheries that a method of controlling licenses into Alaska's salmon fisheries can be based upon objective, standardized criteria designed to favor those most economically dependent on commercial fishing. Stabilizing or reducing the level of gear in the fisheries will result in increased incomes to vocational fishermen.

COM-75-50185-07-05/GA
(Order as COM-75-50185-07)
National Marine Fisheries Service, Auke Bay, Alaska. Auke Bay Fisheries Lab.
A New Incubator for Salmonids Designed by Alaska Laboratory,
Frederick H. Salter. Jul 75, 5p NOAA-75091601-5, MFR-Paper-1153
Included in Marine Fisheries Review, v37 n7 p26-29 Jul 75.

Descriptors: *Salmon, *Fisheries, *Aquaculture, Laboratory equipment, Construction, Design, Cost analysis, Alaska.
Identifiers: *Incubators.

After several years of experimentation, Auke Bay biologists and the research design and devices fabricator have built a salmonid incubator that has the capability to produce high quality fry at a reasonable cost. The system is easy to modify for experimental work and is constructed from materials that facilitate use in the field. Some of the special features of the Auke Bay incubator that are mentioned in this report include: (1) Migration of fry can be voluntary or controlled. (2) Water is used very efficiently. (3) Gas exchange occurs as the water flows and falls into the lower head chamber in a thin sheet. This exchange renews dissolved oxygen and eliminates some of the dissolved ammonia metabolic wastes. (4) Flow is horizontal through the substrate; this can be changed to upwelling by placing the substrate on a perforated false bottom about one-half inch above the bottom of the tray. (5) Egg trays can be easily removed from the front. Water intake for operation is at the front on the top. Water discharge and fry immersion is from the front on the bottom.

JPRS-65762 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Noise Resistance of the Dolphin Auditory Analyzer as a Function of Noise Direction,
K. A. Zaitseva, A. I. Akopian, V. P. Morozov, and Yu. A. Sokovykh. 26 Sep 75, 6p
Trans. of Biofizika (USSR) v20 n3 p519-521 1975.

Descriptors: *Dolphins(Mammals), *Noise(Sound), *Animal communication, Mammals, Cetacea, Aquatic animals, Auditory perception, Sound signals, Animal behavior, Animal navigation, Echo sounding, USSR, Translations, Acoustic signals.
Identifiers: *Echolocation, Bioacoustics, Marine mammals.

Bottlenose dolphin hearing thresholds in the presence of noise were measured as a function of the angle at which noise is presented, and sharp directional sensitivity of the auditory analyzer was discovered, expressed by a sharp drop in the masking effect of noise as the angle of noise direction increases. It was shown that the narrow characteristic of auditory directionality, the width of which is 8 + or - 2 degrees at an intensity of -3 db, is one of the most important mechanisms promoting high resistance to noise in the dolphin echolocation system.

JPRS-65776 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Behavioral States in Free-Moving Dolphins,
L. M. Mukhametov, and A. Ya. Supin. 29 Sep 75, 10p
Trans. of Zhurnal Vysshei Nervnoi Deyatelnosti (USSR) v25 n2 p396-401 1975.

Descriptors: *Dolphins(Mammals), *Animal behavior, *Animal physiology, Electroencephalography, Aquatic animals, Electrodes, Cetacea, Sleep, Electromyography, USSR, Translations.
Identifiers: Tursiops truncatus, Marine mammals.

EEG studies on dolphins which have not been narcotized or deprived of movement is undoubtedly of interest because of the many physiological peculiarities of these marine mammals, which clearly distinguish them from terrestrial mammals in their ecology. However, there have been practically no reports on this subject up to the present time. Only two short communications from the same authors, based on minimum experimental material, are known. The present report relates an attempt at polarographic study of various behavioral states of the free-moving Black Sea dolphin-aphalin Tursiops truncatus.

JPRS-65777 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Dolphin Echolocation,
N. A. Dubrovskii, and G. L. Zaslavskii. 29 Sep 75, 16p
Trans. of Akusticheskii Zhurnal (USSR) v21 n3 p409-414 1975.

Descriptors: *Dolphins(Mammals), *Animal communication, Mammals, Aquatic animals, Cetacea, Sonar detection, Ultrasonic frequencies, Auditory perception, Sound signals, USSR, Translations, Animal behavior, Animal navigation, Echo sounding, Acoustic signals, Experimental data.
Identifiers: *Echolocation, Marine mammals, Bioacoustics.

The report contains an analysis of the temporal structure of the sounding pulse of a dolphin and the results of a study of echolocation discrimination of ball targets differing in size and material.

PB-245 613/5GA PC$4.75/MF$2.25
North Dakota State Univ., Fargo. Dept. of Zoology.
Prairie Pothole Ecology and the Feasibility of Growing Rainbow Trout (Salmo Gairdneri Richardson) in Prairie Potholes.
Master's thesis,
Gary L. Myers. May 73, 98p W75-12157, OWRT-A-032-NDAK(1)

Descriptors: *Trout, *Aquaculture, *Lakes, Growth, Mortality, Toxicity, Feeding stuffs, Plankton, Mercury(Metal), Nutrients, Ammonia, Nitrogen, Cost estimates, Water pollution, Theses, North Dakota, Production.
Identifiers: *Salmo gairdneri, Eutrophication, Water pollution effects(Animals).

Commercial rainbow trout production is not feasible in four North Dakota pothole lakes studied, although trout growth did reach commercial size in one season. Mortality was due to a combination of factors: Initial stocking mortality, diurnal dissolved oxygen fluctuations, water temperature, ammonia toxicity, and bird predation. Trout ate the same foods as salamanders but in different proportions. Trout consumed amphipods, Chaoborus, and Chironomids. Competition with water-fowl for food was not demonstrated. Nitrogen was the limiting nutrient in three lakes; the fourth lake had high nitrogen and ortho-phosphate levels due to a septic tank discharge. Density of rooted vegetation, Ceratophyllum demersum and Myriophyllum exalbescens, appeared to have a negative correlation with blue-green algae blooms. Benthic invertebrates consisted of amphipods and chironomids. The number of oligochaetes appeared to increase, relative to chironomids, as organic enrichment increased.

TT-70-57121 PC$3.25/MF$2.25
Department of Commerce, Washington, D.C.
Introduction of the Insecticidal Tephrosia into the USSR (Introduktsiya Insektitsidnykh Tefrozii v SSSR),
L. A. Razdorskaya. 1975, 20p
Trans. of Sovetskaya Botanika (USSR) n5/6 p67-68 1941. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Plants(Botany), *Insecticides, Chemical properties, Plant growth, Toxicity, Field tests, Translations, USSR.
Identifiers: Tephrosia.

The report deals primarily with Tephrosia, a tropical or subtropical leguminous plant, which was introduced for field tests into the USSR. Tests on the toxicity of the plant for use as a vegetable insecticide are described.

6E. Clinical Medicine

AD-A016 305/5GA PC$3.25/MF$2.25
Oregon Univ Dental School Portland Biophysics Lab
Intraoral Thermography.
Final rept.,
B. S. Savara, and J. W. Irwin. 15 Jul 74, 20p
Contract DADA17-71-C-1083

Descriptors: *Thermography, *Mouth, *Teeth, Oral diseases, Wounds and injuries, Diagnosis(Medicine), Cancer, Neoplasms.

Electronic thermography is a method for depicting the infrared emission patterns of the body in real time by means of a specialized closed circuit televesion system sensitive to radiation around 10 microns. In the present study, thermography has been applied to the intraoral region. Experiments have been performed to determine effects of anatomic curvature in the mouth and to discover the radiative emissivity of mucosa and teeth. Curvature has been found not to cause a significant problem in interpretation. Unlike that of skin (which is around 0.98), the emissivity of mucosa and teeth ranges from 0.73 to 0.94. Unless corrections for emissivity are preset in the thermography system, emissivity differences may make intraoral thermography interpretation inaccurate. At present, thermographic systems do not have such preset emissivity capability designed into them.

AD-A016 374/1GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
A History of Military Dependent Medical Care Programs.
Technical rept.,
Leland Maassen, and David Whipple. Aug 75, 38p Rept no. NPS-55Wp75081

Descriptors: *Military medicine, *Medical services, Finance, Legislation, History.
Identifiers: Projects, *CHAMPUS(Civilian Health and Medical Program of the Uniformed Services), Civilian health and medical program of the uniformed services.

As part of a larger research project into the CHAMPUS (Civilian Health and Medical Program for the Uniformed Services, the legislative history of military dependent medical care programs was traced to illustrate the Congressional intent behind the CHAMPUS program. This history is used to derive normative implications for the form of future program structure changes.

AD-A016 504/3GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
IgE Antipolymyxin B Antibody Formation in a T Cell-Depleted Bone Marrow Transplant Patient.
Medical research progress rept.,
James D. Lakin, William R. Grace, and Kenneth W. Sell. 17 May 74, 13p
Availability: Pub. in Jnl. of Allergy and Clinical Immunology, v56 n2 p94-103 Aug 75.

Descriptors: *Immunoglobulins, Polymyxins, Hypersensitivity, Antibodies, Patients, Leukemia, Whole body irradiation, X rays, Depletion, Thymocytes, Bone marrow, Surgical transplantation, Immunoassay, Reprints.
Identifiers: Immunoglobulin E, Polymixin B, Antipolymixins.

The production of IgE-class antibody specific for polymyxin B is documented in an 18-year-old white female acute myelocytic leukemic patient in relapse. The patient was rendered T cell-deficient by total body X-irradiation and antihuman thymocyte globulin for the purpose of bone marrow transplantation. Thereafter, symptoms of nasal congestion, rhinorrhea, and perinasal urtication produced by topical application of a polymyxin solution were noted. Reaginic activity mediated by an IgE antibody against polymyxin is documented by Prausnitz-Kustner-type passive transfer reactions and by an indirect hemagglutination technique developed for these studies. The occurrence of type I hypersensitivity to this topical antibiotic is rare. It is speculated that pharmaceuticals normally having a low sensitizing potential might demonstrate increased reaginic immunogenicity in a spontaneously or iatrogenically T cell-depleted patient. (Author)

AD-A016 539/9GA PC$3.25/MF$2.25
Naval Medical Field Research Lab Camp Lejeune N C
Serum Myoglobin Levels Predicted from Serum Enzyme Values.
Final rept.,
John E. Olerud, Louis D. Homer, and Harold W. Carroll. 1975, 6p Rept no. NMFRL-Vol-XXV-No-12
Availability: Pub. in New England Jnl. of Medicine, 293 p483-485, 4 Sep 75.

Descriptors: *Serum proteins, Blood analysis, Enzymes, Complement(Biology), Level(Quantity), Mathematical prediction, Regression analysis, Creatinine, Lactic dehydrogenase, Muscles, Exercise(Physiology), Recruits, Marine Corps personnel, Diagnosis(Medicine), Reprints.
Identifiers: *Myoglobin, Myoglobinuria, Myoglobinemia, Creatine phosphokinase, Transaminases, Rhabdomyolysis.

One-hundred-thirty-two of 337 Marine recruits (39.2%) had demonstrable myoglobinemia on at least one occasion during their first six training days. Serum myoglobin levels were determined by means of a specific and sensitive immunologic assay based on the principle of complement fixation. Myoglobin values ranged from 0.37 to 21.9 micrograms/milliliter. None of the recruits sought medical attention for complaints referable to the musculoskeletal or urinary system. A mathematical relationship was recognized between serum myoglobin and the serum enzymes, creatine phosphokinase (CPK), lactic dehydrogenase (LDH), and glutamic-oxalacetic transaminase (GOT). Regression lines were developed which permit myoglobin levels to be estimated as a function of serum enzyme activity. (Author)

AD-A016 543/1GA PC$3.25/MF$2.25
Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical Research
Laser, Scalpel, Electrosurgical, and Tangential Excisions of Third Degree Burns.
Preliminary rept.,
Norman S. Levine, Hugh D. Peterson, Roger E. Salisbury, and Basil A. Pruitt, Jr. 1975, 12p
Presented at the Annual Meeting of the American Society of Plastic and Reconstructive Surgeons, 30 Oct 74, Houston, Tex.
Availability: Pub. in Plastic and Reconstructive Surgery, v56 n3 p286-296 Sep 75.

Descriptors: *Burns(Injuries), *Lasers, Surgical techniques, Excision, Reprints.
Identifiers: Cauterization, Debridement.

The authors conclude that both 'formal' surgical excision and tangential excision may be used advantageously in carefully selected burn patients. The 'formal' excisions (down to fascia) are best performed with the electrocautery or laser. Although laser technology is improving, the laser used in this study was not substantially superior to the electrocautery. 'Formal' surgical excision was most useful in patients with clearly demarcated third degree burns in surgically manageable body areas. For patients with scattered third degree burns, contiguous to second degree burns, tangential excision may be used as an aggressive form of wound debridement.

AD-A016 544/9GA PC$3.25/MF$2.25
Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical Research
Ventilatory Patterns Following Burn Injury and Effect of Sulfamylon,
Peter A. Petroff, Edwin W. Hander, and Arthur D. Mason, Jr. 1975, 8p
Presented at the Annual American Burn Association Meeting (7th), 20-22 Mar 75, Denver, Colo.
Availability: Pub. in Jnl. of Trauma, v15 n8 p650-656 Aug 75.

Descriptors: *Burns(Injuries), *Hyperventilation, Pulmonary function, Sulfonamides, Silver compounds, Nitrates, Ventilation(Physiology), Oxygen consumption, Patients, Pain, Reprints.
Identifiers: Sulfamylon.

Seven burn patients treated with silver nitrate dressings were studied during the first 10 days after injury. Minute ventilation, oxygen consumption, and ventilatory equivalent were measured. Minute ventilation was increased two- to threefold, as was oxygen consumption. Ventilatory equivalent was only slightly increased. Three patients were initially treated with silver nitrate, and then, when clinically stable, were switched to Sulfamylon. They showed a 50% rise in ventilation, tidal volume, ventilatory equivalent, and a slight increase in respiratory rate and VD/VT. In addition, their PO2 increased and base excess fell. Five normal subjects were given Diamox, and their minute ventilation, O2 consumption, and ventilatory equivalent were measured. Diamox produced only a 25% increase in minute ventilation and ventilatory equivalent suggesting that, although some of the increased ventilation of Sulfamylon is due to carbonic anhydrase inhibition, another factor, such as pain also plays a role.

AD-A016 545/6GA PC$3.25/MF$2.25
Armed Forces Inst of Pathology Washington D C
Inheritance of the Dubin-Johnson-Sprinz Syndrome,
Robert H. Edwards. 19 Sep 73, 17p
Availability: Pub. in Gastroenterology, v68 n4 p734-749 1975.

Descriptors: *Bilirubin, *Liver diseases, *Genetics, *Excretion, Liver function tests, Diagnosis(Medicine), Signs and symptoms, Metabolites, Membranes(Biology), Barriers, Reprints.
Identifiers: Dubin Johnson Sprinz syndrome.

Information on families of 44 patients fulfilling strict criteria for the Dubin-Johnson-Sprinz (DJS) syndrome revealed that parental consanguinity in at least 11 cases. Direct and total serum bilirubin levels and sulfobromophthalein retention levels were determined on siblings, parents, and children of these DJS patients. Conjugated hyperbilirubinemia and elevated, increasing serum sulfobromophthalein retention at 2 hr, characteristic of the DJS syndrome, were observed in 17 of 44 tested siblings of propositi. Results of these liver function tests on all of 20 parents and 64 children of DJS patients indicated that they were not affected. The high frequency of parental consanguinity, the incidence of the syndrome among siblings of propositi, the lack of involvement of more than one generation within each family, and consideration of other reports of familial DJS syndrome suggest that the DJS syndrome is inherited only as an autosomal recessive trait. Appreciation of the mode of inheritance may be helpful in the differential diagnosis of the constitutional hyperbilirubinemias and in the elucidation of the nature of the hepatic excretory defect in the DJS syndrome and other constitutional hyperbilirubinemias.

AD-A016 548/0GA PC$3.25/MF$2.25
Armed Forces Inst of Pathology Washington D C
Microinvasive Carcinoma of the Cervix. The Significance of Lymphatic Invasion and Confluent Patterns of Stromal Growth,
William D. Roche, and Henry J. Norris. 11 Jun 74, 7p
Availability: Pub. in Cancer, v36 n1 p180-186 Jul 75.

Descriptors: *Cancer, *Lymphatic system, *Genital tracts, Epithelium, Females, Humans, Gynecology, Diagnosis(Medicine), Pathology, Determination, Decision making, Reprints.
Identifiers: Cervix, Malignancy, Women, Metastasis.

Thirty examples of microinvasive carcinoma of the cervix were studied to determine the presence or absence of lymphatic invasion. Invasion of spaces resembling lymphatic spaces was demonstrated by step sections in more than half of the cases (57%). The pattern of invasion within the stroma, whether confluent or finger-like, did not correlate with the presence or absence of invasion of these spaces. All of the patients had been treated with a pelvic lymphadenectomy, and all of the lymph nodes were negative for metastasis. Thus, neither invasion of what have been considered to be lymphatics nor a confluent pattern of stromal invasion should be a criterion for excluding either the diagnosis of microinvasion or treatment by simple hysterectomy. (Author)

AD-A016 550/6GA PC$3.25/MF$2.25
Armed Forces Inst of Pathology Washington D C
Uveitis and Reticulum Cell Sarcoma of Brain with Bilateral Neoplastic Seeding of Vitreous without Retinal or Uveal Involvement,
Don S. Minckler, Ramon L. Font, and Lorenz E. Zimmerman. 1975, 7p
Availability: Pub. in American Jnl. of Opthalmology, v80 n3 Part 1 p433-439 Sep 75.

Descriptors: *Sarcoma, *Brain, *Eye, Eye diseases, Diagnosis(Medicine), Pathology, Reprints.
Identifiers: Uveitis.

A 65-year-old woman had been observed for more than four years with bilateral chronic nongranulomatous uveitis and vitreous clouding of unknown cause. Her death was from reticulum cell sarcoma of the brain (microglioma). Both eyes were obtained post mortem. Histopathologic examination revealed malignant cells in the vitreous of both eyes, but no other tumor was demonstrable in the ocular tissues. Reticulum cell sarcoma should be suspected in middle-aged or older persons with chronic unilateral or bilateral uveitis of unknown cause who develop cerebral manifestations during the course of the disease. (Author)

AD-A016 551/4GA PC$3.25/MF$2.25
Armed Forces Inst of Pathology Washington D C
Extraskeletal Neoplasm Resembling Ewing's Sarcoma,
Lennart Angervall, and F. M. Enzinger. 17 Jun 74, 12p
Availability: Pub. in Cancer, v36 n1 p240-251 Jul 75.

Descriptors: *Sarcoma, Soft tissues, Bones, Histology, Youth, Chemotherapy, Surgery, Radiotherapy, Lung, Reprints.
Identifiers: Ewings sarcoma, Metastasis.

This article reviews the pathologic features and the behavior of 39 small round, or oval cell sarcomas occurring in the soft tissues and considered histologically indistinguishable from Ewing's sarcoma of bone. The tumors affected chiefly young adults (median age 20 years) and most commonly involved the soft tissues of the lower extremity and the paravertebral region. Microscopically, they consisted of solidly packed small, round, or ovoid cells of great uniformity, arranged in sheets or lobules separated by strands of fibrous connective tissue. The nucleus of the tumor cells contained finely divided chromatin, a distinct nuclear membrane, and frequently a minute nucleolus. Followup data ranging from 1 month to 14 years were available in 35 of the 39 cases (93%). Of these, 13 were alive and 22 had died. In the majority of the fatal cases, the clinical course was rapid; metastatic lesions developed within a few months after the primary tumor was excised. The lungs and the skeleton were the two most common sites of metastasis. Cure may be achieved by wide local excision of the tumor at an early stage of the disease, combined with radiation therapy and chemotherapy.

AD-A016 553/0GA PC$3.25/MF$2.25
Armed Forces Inst of Pathology Washington D C
Cystic Adenomatoid Malformation of the Lung Morphologic Analysis,
John E. Madewell, J. Thomas Stocker, and Jack M. Korsower. 1975, 13p
Presented at the Annual Meeting of the American Roentgen Ray Society (75th) 24-27 Sep 74, San Francisco, Calif.
Availability: Pub. in The American Jnl. of Roentgenology, Radium Therapy and Nuclear Medicine, v124 n3 p436-448 Jul 75.

Descriptors: *Neoplasms, Radiography, Lung, Cysts, Pediatrics, Respiratory diseases, Diagnosis(Medicine), Infants, Reprints.
Identifiers: Adenoma.

Thirty-one cases of cystic adenomatoid malformation were reviewed. Of this group 15 had roentgenograms. The most common roentgen pattern is that of a multicystic lucent lesion with cyst expansion and mediastinal shift. The cyst walls are usually thick and composed of small nonexpanded adenomatoid cysts, alveoli, blood vessels and atelectatic areas. These cysts commonly contain fluid at gross cutting and often demonstrate air-fluid levels on roentgenograms. Respiratory distress is related to the degree of lung involvement and expansion of the adenomatoid cysts. The roentgenologist and pediatrician play a significant role in patient management through accurate diagnosis, since infant survival depends on subsequent

prompt surgical removal of the affected lung tissue.

AD-A016 554/8GA PC$3.25/MF$2.25
Walter Reed Army Medical Center Washington D C
Clinical Pathologic Conference,
Melvin D. Cheitlin, Carlos M. deCastro, Daniel M. Knowles, John J. Fenoglio, Jr., and Hugh A. McAllister, Jr. 17 Feb 75, 8p
Availability: Pub. in American Heart Jnl., v90 n2 p248-254 Aug 75.

Descriptors: *Cardiology, Pathology, Diagnosis(Medicine), Sarcoma, Reprints.

No abstract available.

AD-A016 555/5GA PC$3.25/MF$2.25
Armed Forces Inst of Pathology Washington D C
The Air Bronchogram in Interstitial Disease of the Lungs -- A Radiological-Pathological Correlation,
James C. Reed, and John E. Madewell. 1975, 9p
Presented at the Scientific Assembly and Annual Meeting of the Radiological Society of North America (60th), Chicago, Ill., 1-6 Dec 74.
Availability: Pub. in Radiology, v116 n1 p1-9 Jul 75.

Descriptors: *Respiratory diseases, *Bronchography, *Lung, Radiography, Interstitial, Alveoli, Pneumonia, Neoplasms, Lymphomas, Granuloma, Diagnosis(Medicine), Reprints.
Identifiers: Sarcoidosis.

The air bronchogram classically signals an end-air-space or 'alveolar' filling process such as alveolar proteinosis and bronchioloalveolar-cell carcinoma. However, it can also occur in interstitial diseases, possibly leading to compressive atelectasis and causing crowding of tissue around open airways. In addition, such disease processes may encroach on distal airways, producing obstructive pneumonia which may then surround open proximal airways, as in sarcoidosis and lymphoma. In mixed 'alveolar' and interstitial processes such as Pneumocystis carinii pneumonia and the late stages of hemosiderosis, 'alveolar' filling may mask the interstitial disease. (Author)

AD-A016 556/3GA PC$3.25/MF$2.25
Armed Forces Inst of Pathology Washington D C
Cardiac Involvement in Whipple's Disease,
Hugh A. McAllister, Jr., and John J. Fenoglio, Jr. 27 Jan 75, 6p
Availability: Pub. in Circulation, v52 p152-156 Jul 75.

Descriptors: *Gastrointestinal diseases, *Heart, Pathology, Cardiology, Electrocardiography, Pericardium, Inflammation, Myocardium, Intestines, Reprints.
Identifiers: Whipples disease, Lipodystrophy.

Although cardiac involvement in Whipple's disease has been reported previously, the extent and significance of such involvement has not been stressed. In a series of 19 patients, 58% had clinical cardiac findings and 79% had gross cardiac lesions at autopsy. Histologically there were PAS-positive macrophages in the pericardium, myocardium, and valves of each of these patients. These collections of macrophages were associated with chronic inflammatory cells and foci of fibrosis with resultant adhesive pericarditis, focal myocardial fibrosis similar to the fibrosis of idiopathic cardiomyopathy, and valvular fibrosis with deformity grossly resembling the valvular lesions of chronic rheumatic heart disease. Four of the patients with mitral valvular deformity had cardiac murmurs, and ECG changes were noted in six patients with extensive focal myocardial fibrosis. In addition, pericardial friction rubs were heard in two patients. By electron microscopy rod-shaped bodies, presumably bacteria, were noted in the mitral valve and myocardium. The structures are identical to those described in the small intestinal mucosa of patients with Whipple's disease and presumably are the causative agent of the pancardiopathy.

AD-A016 557/1GA PC$3.25/MF$2.25
California Univ Davis Dept of Medical Microbiology
The Present Status of Vaccination against Coccidioidomycosis in Man,
Demosthenes Pappagianis, and H. B. Levine. 23 Dec 74, 13p
Contract DADA17-69-C-9061
Report to the Commission on Acute Respiratory Disease of the Armed Forces Epidemiological Board.
Availability: Pub. in American Jnl. of Epidemiology, v102 n1 p30-41 1975.

Descriptors: *Vaccines, Coccidioides immitis, Immunology, Fungus diseases, Humans, Dosage, Antibodies, Reprints.
Identifiers: Killed vaccines, Coccidioidomycosis.

Vaccines of killed whole cells of Coccidioides immitis have been injected intramuscularly in 97 human subjects to determine the safety and tolerable dose of vaccine and certain immunologic responses. Seventy-eight individuals received the whole killed spherule preparation; 18 received killed mycelial vaccine. The maximum tolerable dose of spherule vaccine was approximately 5 mg. Systemic effects were slight though in two prior coccidioidin reactors a moderate febrile illness and substantial antibody production followed vaccination with killed spherules. The vaccines irregularly induced antibody or delayed hypersensitivity to coccidioidin or spherule antigen. Greater antigenic mass perhaps as a soluble preparation may be needed for consistent immunologic stimulation though the spherule vaccine may be protective despite absence of detectable antibody or sensitivity to coccidioidin. (Author)

AD-A016 588/6GA PC$3.25/MF$2.25
Naval Health Research Center San Diego Calif
Life Change Events, Ballistocardiography and Coronary Death,
Tores Theorell, and Richard H. Rahe. Sep 75, 10p Rept no. 75-49

Descriptors: *Myocardial infarction, *Coronary disease, *Cardiovascular diseases, *Psychophysiology, *Stress(Psychology), Mortality rates, Epidemiology, Stress(Physiology).
Identifiers: *Life changes, *Ballistocardiography, Psychosomatic disorders.

Thirty-six men and women who experienced a documented myocardial infarction, half of whom died from their disease and half of whom survived over the following six-year period, provided longitudinal recent life changes and ballistocardiographic data. The 18 patients who died from their coronary disease indicated a build-up in life changes which peaked at approximately one year prior to death; their serial ballistocardiographies indicated a build-up in average force of contraction which peaked during the final six months prior to death. The 18 post-infarction patients who survived the six-year follow-up interval showed neither a build-up in life change nor a build-up in a ballistocardiographic index of cardiac contraction force. These findings are discussed as to their possible medical and psychological significances in the understanding of the natural history of coronary death.

AD-A016 640/5GA PC$5.75/MF$2.25
Paris-5 Univ (France)
Point Electroanesthesia (General Electro-Pharmaceutical Anesthesia for Major Urological Human Surgery.
Annual rept. no. 1, 1 Feb 73-31 Jan 74,
Aime Limoge, Christian Debras, Raymond Coeytaux, and Maurice Cara. Apr 74, 140p
Contract DADA17-73-C-3056

Descriptors: *Electroanesthesia, *Anesthesia, Medical equipment, Bioinstrumentation, Surgery, Kidneys, Humans, Response(Biology), Assessment.
Identifiers: Urology.

Studies were conducted to develop portable instrumentation, small enough to be used in the field hospital, which produces safe, quickly induced, depth-regulatable, rapidly reversible general electroanesthesia. At the end of clinical, paraclinical and biological studies covering 130 patients operated under electro-pharmaceutical anesthesia, the following facts were established: The use of an unidirectional pulse current of high frequency does not have an irreversible detrimental effect, neither on the cerebral tissue, nor on other tissues or on the general metabolic processes. The genuine and unquestionable effect of the current manifests if the current is used in combination with minimal premedication drugs causing an increase in the intra-cellular level of potassium in the cerebral cells. The decrease in local and general infections observed post-operatively for major urological operations is statistically significant.

AD-A016 652/0GA PC$3.25/MF$2.25
Sidney Farber Cancer Center Boston Mass
The Nature of the Reaginic-Like Response in Infected Mice.
Final rept. 1 Aug 70-31 Jan 75,
Saul Malkiel. 31 Jan 75, 15p
Contract N00014-71-C-0102

Descriptors: *Plasmodium, *Immunology, *Malaria, Parasites, Antigen antibody reactions, Glucose, Phagocytes, Hypoglycemia, Mice, Laboratory animals, Experimental data, Response(Biology), Hemolysis, Complement(Biology).
Identifiers: Reagins, Plagues(Microbiology).

The induction of antibody by spleen cells in culture after primary exposure to an antigen, mouse crythrocytes (RBC) parasitized with the NYU-2 strain of Plasmodium berghei, has been demonstrated by the Cunningham modification of the Jerne plaque assay technique. This finding corroborates the indirect evidence of Hirsch and Plescia who reported that T cells taken from mice four hours after immunization with sheep RBC can stimulate normal spleen cells to induce specific antibodies in vitro. In the present experiments, the observed hemolysis resulting in the formation of a plaque is interpreted as being the result of a specific antibody-antigen reaction. Support for this premise lies in the observation that the hemolysis is complement-dependent and can be inhibited by cycloheximide which is ineffective in suppressing cytophilic antibody formation.

AD-A016 751/0GA PC$3.25/MF$2.25
Hahnemann Medical Coll and Hospital Philadelphia Pa Dept of Physiology and Biophysics
Changes in Lactate Kinetics Four and Twenty-four Hours after Hemorrhage in the Conscious Dog,
Roslyn Wiener, and John J. Spitzer. 3 Dec 73, 8p
Contract N00014-72-A-0317, Grant PHS-HL-03130
Availability: Pub. in Circulatory Shock, v1 n2 p145-152 1974.

Descriptors: *Hemorrhage, *Dogs, *Lactates, Physiology, Kinetics, Biochemistry, Metabolism, Reprints.

Lactate kinetic data were investigated employing the primed infusion of sodium L(+)-U-C14 lactate before, 4 to 5 hours after, and 24 hours after the withdrawal of 35% of the measured blood volume in eight conscious mongrel dogs. During the 4th hour posthemorrhage, blood volume and blood pressure were reduced by 25% from control values; cardiac output, however, was decreased by 40% from the control despite considerable increase in heart rate. Whole body oxygen consumption was reduced at that time. The arterial lactate concentration 3 to 4 hours after hemorrhage was 3 times the control value, and there was an associated marked increase in lactate turnover. The enhanced rate of lactate appearance during the 4th hour after hemorrhage was matched by a comparable increase in the rate of lactate disappearance. Lactate oxidation was increased and lactate carbon provided a higher percentage of the metabolic CO2 production than during control conditions. Gluconeogenesis from lactate was also increased. By 24 hours after hemorrhage, blood volume was not significantly increased over the 3- to 4-hour level, although the hematocrit was reduced significantly. Cardiac output returned to control value. Arterial lactate concentration, lactate turnover, appearance and disappearance rates, lactate oxidation, and percentage of lactate contribution to CO2 production were in the range of control values by 24 hours after hemorrhage. It is concluded that lactate served a more important metabolic role in the period of hypoperfusion during the 4th hour after hemorrhage under the conditions of these experiments. (Author)

AD-A016 887/2GA PC$5.25/MF$2.25
Army Aeromedical Research Lab Fort Rucker Ala
Annual Progress Report, 1 July 1974 - 30 June 1975,
Robert W. Bailey. 30 Jun 75, 117p

Descriptors: *Aviation medicine, *Medical research, *Aviation personnel, Helicopters, Army personnel, Vibration, Orthopedics, Crashes, Wounds and injuries, Physiology, Life support, Human factors engineering, Man machine systems, Economics, Ground support, Protection, Army training, Fatigue(Physiology), Stress(Physiology), Bioengineering, Biochemistry, Visual perception, Hearing, Visual acuity, Performance(Human), Retina, Oxygen, Research management.

The mission of the US Army Aeromedical Research Laboratory is to conduct fundamental and applied research on the medical aspects of Army aviation, airborne and ground operations that affect the health, welfare and efficiency of the soldier; perform medical research on visual/auditory functions; man/machine integration; the medical aspects of non-medical materiel; physiological/psychological responses to the operational environments; and military operational training impacts upon ecology. (Author)

AD-A016 960/7GA PC$12.00/MF$2.25
Army Medical Research Inst of Infectious Diseases Frederick Md
Annual Progress Report - FY 1975.
1 Jul 75, 492p
See also Annual Progress Rept. FY 1974, AD-786 550.

Descriptors: *Medical research, *Infectious diseases, *Military medicine, Immunity, Immunology, Pathology, Physiology, Bacterial diseases, Virus diseases, Rickettsia, Vaccines, Biochemistry, Biological warfare.
Identifiers: Rickettsial diseases.

A report of progress on the research program of the U. S. Army Medical Research Institute of Infectious Diseases on medical defense against biological agents for fiscal year 1975 is presented.

COM-75-50591/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Reply to Clinical Chemistry Article.
Final rept.,
Peter W. Finkel, Ted R. Miller, and M. Keith Weikel. 1974, 3p
Pub. in Clinical Chemistry, v20 n4 p521, 523-524 1974.

Descriptors: *Medical laboratories, Hematology, Microbiology, Biochemistry.
Identifiers: *Clinical chemistry, Reprints.

The February 1974 issue of Clinical Chemistry published a critique of two NBS Interagency Reports. The Bureau has prepared a reply, written by the senior author of both NBS reports, and coordinated through the Institutes for Applied Technology and Materials Research.

NTIS/PS-75/799/7GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Transplantation Immunology (A Bibliography with Abstracts).
Rept. for 1970-Oct 75,
Pernell W. Crockett. Oct 75, 127p*
Supersedes NTIS/PS-74/124.

Descriptors: *Bibliographies, *Immunology, *Surgical transplantation, Antigen antibody reactions, Tissues(Biology), Compatibility.
Identifiers: Histocompatibility, Tissue typing, HLA antigens, Histocompatibility antigens, Graft versus host disease.

The cited reports discuss histocompatibility, tissue typing, graft versus host response, and immunosuppression. (Contains 122 abstracts)

PB-244 829/8GA PC$3.75/MF$2.25
Veterans Administration Hospital, San Francisco, Calif. Nephrology Service.
Investigations into the Pathophysiology of Dialysis Disequilibrium Syndrome.
Annual rept. 1 Jul 73-30 Jun 74,
Allen I. Arieff, and Raul Guisado. 2 Aug 74, 45p
AK-3-72-2201
Contract N01-AM-3-2001
Prepared in cooperation with California Univ., San Francisco. Dept. of Medicine. See also PB-224 071.

Descriptors: *Artificial kidneys, *Brain, *Uremia, Central nervous system, Pathophysiology, Edema, Musculoskeletal system, Dogs, Experimental data, Metabolism, Glycerol, pH, Renal failure, Calcium, Electrolytes.
Identifiers: *Hemodialysis, *Dialysis disequilibrium syndrome.

The investigation is designed to investigate changes produced by the uremic state in the central nervous system, peripheral nerve, and skeletal muscle. Parameters to be evaluated include measurements in tissues, CSF and plasma of Na(+), K(+), Cl(-), Ca(++), Mg(++), urea pH, pCO2, bicarbonate, pO2, glucose and lactate. Changes in the electroencephalogram and electromyography will also be determined. Studies will be done in animals with either acute or chronic renal failure. The effect(s) of hemodialysis on these alterations will then be studied. Based on the pathophysiologic mechanisms elucidated by the aforementioned procedures, appropriate therapeutic and preventative modalities will then be evaluated.

PB-245 086/4GA MF$2.25
National Research Council, Washington, D.C. Committee for the Study of Inborn Errors of Metabolism.
Genetic Screening: Programs, Principles, and Research.
Aug 75, 388p* ISBN-0-309-02403-X
Contract NSF-C310
Paper copy available from National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, D.C. 20418 $6.00.

Descriptors: *Hereditary diseases, *Preventive medicine, Sickle cell anemia, Genes, Genetics, Diagnosis, Selection, Populations, Public health, Projects, Attitudes, Physicians, Law(Jurisprudence), Sociology, Ethics.
Identifiers: *Genetic screening, Downs Syndrome, Tay-Sachs disease, Medical ethics, Phenylketonuria.

The report provides a comprehensive review of current genetic screening programs, and considers possible directions for future screening practices. Guidance is offered for health authorities planning to improve existing programs or develop new ones. Discussion areas include: a history of screening for phenylketonuria (PKU) in the United States, embracing medical, social, and legal experiences; attitudes of physicians and the public toward screening and other preventive health care programs; a survey of experiences with screening for sickle-cell anemia, Tay-Sachs disease, and Down's Syndrome. The report is intended for health professionals as well as consumers, policy makers, social scientists.

PB-245 142/5GA MF$2.25
National Academy of Sciences, Washington, D.C.
Experiments and Research with Humans: Values in Conflict.
May 75, 232p ISBN-0-309-02347-5
Contract N01-OD-5-2116
Library of Congress Catalog Card no. 75-13985.
Paper copy available from National Academy of Sciences, 2101 Constitution Ave., Washington, D.C. 20418, $5.00.

Descriptors: *Experimentation, *Humans, *Meetings, Ethics, Research management, Values, Disadvantaged groups, Minority groups, National government, Litigation, Embryos, Infants, Females, Legislation.
Identifiers: *Medical ethics.

The report contains the formal presentations and discussions of a public forum held in Feb. 1975. More than 500 medical researchers, physicians, lawyers, government officials, ethicists, human rights representatives and others participated or attended. Topics covered include informed consent by the research candidate, research on fetuses and on children, research participation by the poor or institutionalized, the means used to obtain volunteers for experiments, and the future role of federal legislation.

PB-245 146/6GA MF$2.25
National Academy of Sciences, Washington, D.C. Inst. of Medicine.
Controls on Health Care. Papers of the Conference on Regulation in the Health Industry, Held in Washington, D.C. on January 7-9, 1974.
May 75, 183p* ISBN-0-309-02330-0
Contract HEW-OS-74-95
Paper copy available from National Academy of Sciences, 2101 Constitution Ave., Washington, D.C. PC$5.25.

Descriptors: *Medical services, Regulations, Rates(Costs), Hospitals, Manpower, Medical personnel, State government, National government, Financial management.
Identifiers: Nursing homes, Health care delivery systems, Health maintenance organizations.

The report examines the problems and prospects for further regulation in a field already extensively regulated by both federal and state governments. Topics of discussion include the existing regulatory structure, the experience of the public utility industry with regulatory controls, further development of health maintenance organizations, state certification-of-need laws, rate regulation of hospitals and nursing homes, and alternative financial arrangements in health care delivery.

PB-245 324/9GA PC$6.25/MF$2.25
Geomet, Inc., Gaithersburg, Md.
Effects of Discontinuing Categorical Project Grants for Tuberculosis Control. A Pilot Study.
Final rept. Jun-Nov 74,
Robert R. Henderson, Michael D. Koontz, and John K. Oliverson. Jan 75, 157p GEOMET-HF-398 HEW-CDC-74-9
Contract HEW-CDC-21-74-539

Descriptors: *Tuberculosis, *Medical services, *Public health, Preventive medicine, Bacterial diseases, Infectious diseases, Grants, State government, Surveys, Recommendations, Questionnaires, Evaluation, Projects, Data processing, Therapy.
Identifiers: Health care facilities.

The study evaluates the effect of discontinuing categorical project grants on state and local tuberculosis control programs. The report documents the methods and materials used in the selection of study sites and in the collection and analysis of data. Discussion brings together the study's findings and their interpretation. The report's conclusions and recommendations, along with a brief summary of the project, are given in the final chapter. A detailed within-site analysis is found in appendix A.

PB-245 746/3GA PC$5.25/MF$2.25
Indiana State Univ., Terre Haute.
Demonstration of An Approach to the Internship Concept in Environmental Health,
Herman Koren. 15 Dec 69, 110p
Contract PHS-CPS-69-002

Descriptors: *Medical personnel, Manpower, Education, Students, Evaluation, Training programs, Public health, Universities.
Identifiers: *Environmental health, Health manpower, Medical education.

Instead of hiring general scientists or majors in chemistry and biology to work as environmental health specialists, the approach is suggested that an internship program be developed. Under the close supervision of the university coordinator and the health department supervisor, the intern works full-time as a productive member of the staff of local, county, or state health department while he gains practical experience, refines his basic environmental skills, learns to work with people, learns to identify problems and make reasonable recommendations, develops techniques for studying major problems in depth, and prepares comprehensive reports.

PB-245 805/7GA PC$8.75/MF$2.25
Nephrology Cost Group, Houston, Tex.
Hemodialysis Costs in the United States.
Final rept. 7 Sep 73-13 Dec 74,
Paul A. Hoffstein. 31 Dec 74, 291p AK-1-NIH-74-C-222
Contract AK-1-NIH-74-C-222

Descriptors: *Artificial kidneys, Medical services, Dialysis, Uremia, Renal failure, Cost analysis, Therapy, Patients, United States, Medical equipment.
Identifiers: *Health care costs, *Hemodialysis.

The study's primary objective was to define the required dialysis modalities and to generate the cost per dialysis for each modality. All costs associated with the dialysis procedure were included. Using a uniform methodology, cost were collected on four care levels which vary significantly from each other in the use of direct labor. They are: self care, self care training, limited care, and full care. Costs were also segregated into five major objects of expenditure categories: personnel, supplies, travel, equipment and other. The study was designed to show the range of costs in five 'representative' centers throughout the country, but not to provide statistical 'average' of dialysis costs. Cost per dialysis ranged from $33-$66 for the home patient group, $100-$116 for limited care, $114-$172 for in-hospital, and, $146-$259 for the home training units.

6F. Environmental Biology

AD-A016 600/9GA PC$10.00/MF$2.25
Defense Documentation Center Alexandria Va
Ecology.
Report bibliography Jan 65-Apr 75.
Oct 75, 358p Rept no. DDC/BIB-75/13

Descriptors: *Ecology, *Bibliographies, Plants(Botany), Marine biology, Aquatic animals, Birds, Insects, Viruses, Arboviruses, Tropical regions, Arctic regions, Industrial relations, Water pollution.

The annotated bibliography contains unclassified-unlimited citations on ecology. The four computer-generated indexes provided are Corporate Author-Monitoring Agency, Subject, Title and Personal Author.

AD-A016 897/1GA PC$3.75/MF$2.25
Edgewood Arsenal Aberdeen Proving Ground Md
Results from Aquatic Ecological Surveys at Newport Army Ammunition Plant, Newport, Indiana.
Technical rept. Feb-Jun 73,
Edward S. Bender, and J. Gareth Pearson. Oct 75, 39p Rept no. EB-TR-75044

Descriptors: *Ecology, *TNT, *Water pollution, *Marine biology, Ammunition, Industries, Water quality, Rivers, Streams, Fishes.
Identifiers: *Industrial wastes, Water pollution effects(Animals).

Aquatic ecological surveys were conducted at Newport Army Ammunition Plant (NAAP) from February through June 1973 to determine the effects of TNT manufacturing and other plant operations on the water quality and stream biota of the drainages surrounding NAAP. Macroinvertebrates and stream water quality were sampled monthly, and fishes quarterly. Fishes collected were typical for streams in the area. Diversity and abundance of macroinvertebrates were affected more by natural fluctuations in the flow and runoff than by discharges or accidental spill from the TNT facility.

AD-A016 931/8GA PC$4.75/MF$2.25
Army Dugway Proving Ground Utah
A Canopy Penetration Model for Aerially Disseminated Insecticide Spray Released above Coniferous Forests.
Final rept.,
Bruce S. Grim, and John W. Barry. Aug 75, 81p Rept no. DPG-FR-C625A

Descriptors: *Insecticides, Insect control, Mathematical models, Aerosols, Canopies, Distribution, Penetration, Forests, Wind direction, Sprays.

A simple mathematical simulation model has been developed to predict the penetration and vertical distribution of insecticide sprays through coniferous canopies. Input parameters for the model consist of forest characteristics and the wind profile through the canopy.

AD-A016 948/2GA PC$4.25/MF$2.25
Moss Landing Marine Labs Calif
Effects of Engineering Activities on the Ecology of Pismo Clams.
Miscellaneous paper,
James Nybakken, and Mark Stephenson. Sep 75, 67p CERC-MP-8-75
Contract DACW72-72-C-0016

Descriptors: *Ecology, *Clams, *Aquatic animals, *Shellfish, Marine biology, Distribution, Reproduction(Physiology), Aging(Physiology), Growth(Physiology), California.
Identifiers: Pismo clams, Tivela stultorum, Monterey Bay(California).

Three aspects of the ecology of Pismo clams (Tivela stultorum) were investigated in Monterey Bay, California: distribution, reproduction cycle, and age and growth. Pismo clam populations were found to be restricted to bay areas between the Salinas River and Santa Cruz. Highest densities recorded were intertidal, and subtidal clam beds were few and with low densities. Most clams appeared randomly dispersed, and different size classes did not show a vertical separation. The presence and absence of clams were shown to be correlated with beach slope and grain size. Pismo clams mature in their second year in Monterey Bay, and the primary spawning time is in September and October. The growth rate is more rapid in young clams and varies throughout the year in all size classes but is most rapid in the summer and fall.

NTIS/PS-75/796/3GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Bioindicators of Pollution (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
Elizabeth A. Harrison. Oct 75, 172p*
Supersedes NTIS/PS-75/024.

Descriptors: *Bibliographies, *Air pollution, *Water pollution, *Indicator species, Microorganisms, Animals, Plants(Botany), Algae, Bacteria, Aquatic plants, Oysters, Snails, Physiological effects.
Identifiers: Water pollution detection, Air pollution detection, *Bioindicators, Pollutant identification.

The bibliography includes abstracts that discuss the use of micro-organisms, animals, plants, and fishes to detect air and water pollution. Some of the organisms discussed are algae, bacteria, aquatic plants, oysters, snails, clams, insects, annelida, amphibians, beaver and fungi. (Contains 167 abstracts)

PB-245 598/8GA PC$3.75/MF$2.25
National Environmental Research Center, Las Vegas, Nev. Technical Support Lab.
Preliminary Milk Report.
Environmental monitoring series,
Arthur N. Jarvis, and David G. Easterly. Jun 75, 43p EPA/680/4-75/007

Descriptors: *Milk, *Radioactive isotopes, Radiochemistry, Ecology, Environments, Strontium isotopes, Dairy products, Quality control, Strontium 90, Iodine isotopes, Barium isotopes, Cesium isotopes, Radioactivation analysis, Tables(Data).
Identifiers: Radiation measurement instruments, Radioecology.

A summary of the results of the milk cross-check program from July 1973 through November 1974 is given. Examination of these results reveals that 29% of the participants were within the plus or minus 3 sigma control limits for strontium-89 analysis, 42% for the strontium-90, 52% for barium-140, 80% for iodine-131, and 77% for cesium-137. These results indicate the need for improvement in analytical procedures for the radionuclides studies. Accurate analysis of strontium-89 was particularly difficult for most laboratories to achieve, while the accurate analysis of cesium-137 was the least difficult.

6H. Food

AD-A016 425/1GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Air-Force-Prepared Frozen Meals Evaluated for Inflight Service.
Final rept. May-Oct 74,
Joseph C. Crigler, John E. Vanderveen, and Mary A. Sanders. Aug 75, 16p Rept no. SAM-TR-75-26

Descriptors: *Frozen foods, Inflight, Acceptability, Flight crews, Questionnaires, Flavor, Taste, Food processing, Packaging, Containers, Compatibility, Ovens, Military aircraft.
Identifiers: *Flight rations.

An operational test was conducted to compare the acceptability of Air-Force-prepared frozen meals with those bought on contract from a commercial source. Neither type meal was superior when they were compared on the basis of appearance, taste, and overall acceptability. Provided the Air Force meals are packaged in containers compatible to aircraft ovens, these meals can be substituted without loss of quality or acceptability. (Author)

AD-A016 863/0GA PC$5.25/MF$2.25
Army Natick Development Center Mass
Consumer Evaluation of Cash Food Systems: Shaw Air Force Base.
Technical rept.,
James R. Sisbold, and Herbert L. Meiselman. Dec 74, 107p Rept no. NDC-TR-75-77-FSL

Descriptors: *Food dispensing, *Air Force facilities, Acceptability, Attitudes(Psychology), Military personnel, Consumers, Feeding, Interviewing, Questionnaires, Surveys.
Identifiers: Shaw Air Force Base.

Three projects were undertaken to evaluate the impact on consumer attitudes of a food system at Shaw Air Force Base in which all customers received a monetary food allowance and paid for food in the dining hall on an item-by-item basis (BAS/A La Carte): (a) A consumer opinion survey, on which data from other Air Force Bases were available for comparison purposes; (b) a survey related to alternatives to the traditional rations system; and (c) face-to-face interviews with attenders and nonattenders of the Shaw facility.

AD-A016 895/5GA PC$3.75/MF$2.25
Army Natick Development Center Mass
An Analysis of Consumer Nutrition in the Experimental Food Service System at Travis AFB.
Technical rept.,
John R. Wetmiller, and T. T. Mattus, Jr. Jan 75, 47p Rept no. NDC-TR-75-70-OR/SA

Descriptors: *Military rations, *Nutrition, Air Force, Dining halls, Menu, Food consumption, Food dispensing, Consumers, Assessment.
Identifiers: *Food services, Evaluation.

An experiment was conducted at Travis AFB to evaluate proposed improvements to Air Force food service operations. The experiment included the introduction of three new military food service concepts which affected both customer eating habits and attendance patterns. This report provides a detailed evaluation of the nutritional adequacy of the experimental system. It is concluded that all nutritional requirements are satisfied, and that the total system is even more nutritionally effective because customer utilization and attendance were significantly increased.

COM-75-50185-07-03/GA
(Order as COM-75-50185-07)
National Marine Fisheries Service, Gloucester, Mass. Northeast Utilization Research Center.
Vacuum Cooling and Thawing Fishery Products,
Joseph H. Carver. Jul 75, 8p NOAA-75091601-3, MFR-Paper-1151
Included in Marine Fisheries Review, v37 n7 p15-21 Jul 75.

Descriptors: *Fishes, *Frozen foods, *Vacuum apparatus, Melting, Cooling, Defrosting, Freezing, Coolers, Heat transmission, Shrimps, Equipment, Design.
Identifiers: *Fishing products.

A standard pilot plant size retort was modified for purposes of developing empirical information on dehydrocooling fresh fish and vacuum/heat-thawing (VHT) frozen fishery products. Results indicated that effective multipurpose vacuum/heat-processing systems can be constructed from readily available commercial equipment. Dehydrocooling tests indicated that small fish such as whiting can be cooled to 0C in about 1/2 hour, and VHT tests showed that frozen blocks of headed and gutted (H&G) whiting and shrimp can be thawed in from 1/2 to 1 hour. The described equipment is usable both ashore and at sea. At sea, it is proposed that enough heat energy to power the equipment can be extracted from waste stack gases.

PB-245 428/8GA PC$5.25/MF$2.25
Booz-Allen and Hamilton, Inc., Washington, D.C.
Development of Alternatives to Present Patterns and Settings of Alcohol Taking.
Final rept.
7 Aug 74, 103p NIAAA/NCALI-75/25
Contract NIAAA-ADM-41-74-0017

Descriptors: *Wines, *Commerce, Organizations, Methodology, Public relations, Consumers, Sales, Behavioral sciences, Alcoholism, Social psychology, Feasibility, Consumption rate.
Identifiers: *Beverage bars, Alternatives, Wine bars.

The business strategy of selling wine in four types of bars is illustrated. The wine bar concept appears commercially feasible. Consumer acceptance was rated by two test approaches. Attracting a large number of customers rather than pushing drinks on any particular customer is recommended.

6J. Industrial (Occupational) Medicine

AD-A016 344/4GA PC$4.75/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
Cost Prediction Models for Bringing Selected Air Force Logistics Command Facilities into Compliance with the Occupational Safety and Health Administration Standards.
Master's thesis,
Dannie O. Burk, and George H. Moeller. Aug 75, 92p Rept no. SLSR-39-75B

Descriptors: *Buildings, *Cost analysis, *Cost estimates, *Logistics planning, Theses, Mathematical models, Air Force, Tables(Data), Safety, Industrial hygiene, Standards.
Identifiers: *Occupational safety and health, Recommendations.

The purpose of the study was to ascertain if groupings of Air Force buildings, having the same or similar characteristics (as described in real property records) could be correlated into a mathematical model that would predict the costs necessary to bring buildings into compliance with standards as set by the Occupational Safety and Health Administration. Building characteristics from Air Force real property records (such as floor space, age, and function) were sorted and regressed against estimated costs obtained from an actual MAJCOM survey. The model shows that a correlation can be made between building characteristics and actual survey estimated OSHA retrofit costs. Using similar models, budget estimates for renovation could be calculated for buildings with same or similar characteristics. Recommendations for future surveys are included.

NTIS/PS-75/800/3GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Industrial Health Hazards Due to Atmospheric Factors (A Bibliography with Abstracts).
Rept. for 1970-Jun 75,
Elizabeth A. Harrison. Oct 75, 207p*
Supersedes NTIS/PS-75/022.

Descriptors: *Bibliographies, *Air pollution, Toxicology, Industrial medicine, Occupational diseases, Industrial hygiene, Public health, Toxicology, Hazardous materials, Mining, Recommendations.
Identifiers: Indoor air pollution, *Air pollution effects(Humans), Industrial atmospheres, Air pollution control.

The bibliography contains abstracts of research reports covering such topics as industrial medicine, occupational diseases, health of miners, and the toxicological factors of various pollutants. Some pollutants included are manganese, radon, silicon dioxide, explosives, asbestos, platinum, palladium, polyvinyl chloride, nickel, pesticides, chromium, plastics and vanadium. (Contains 202 abstracts)

6K. Life Support

N75-31743/8GA PC$3.25/MF$2.25
ILC Industries, Inc., Dover, Del.
On Development of a Sealed Bearing for Space Suits.
Final Report.
J. Rayfield. 1975, 15p NASA-CR-144435
Contract NAS9-14399

Descriptors: *Extravehicular activity, *Space suits, Adhesive bonding, Cycles, Performance tests, Sealers.

For abstract, see STAR 1322

N75-31745/3GA PC$6.25/MF$2.25
ILC Industries, Inc., Dover, Del.
On Development of an Inexpensive, Lightweight Thermal Micrometeroid Garment for Space Suits.
Final Report.
16 Jul 75, 156p NASA-CR-144428
Contract NAS9-14199

Descriptors: *Space suits, *Thermal protection, Cost effectiveness, Nonflammable materials, Weight (Mass).

For abstract, see STAR 1322

N75-31746/1GA PC$10.00/MF$2.25
Hamilton Standard, Windsor Locks, Conn.
Thermal Control Extravehicular Life Support System.
Final Report, Jun. 1973 - Aug. 1975.
Aug 75, 371p NASA-CR-144425, SPO-3T75
Contract NAS9-13574

Descriptors: *Life support systems, *Temperature control, Extravehicular activity, Heat radiators, Humidity, Prototypes, Reliability engineering, Water management.

For abstract, see STAR 1322

N75-31747/9GA PC$7.00/MF$2.25
Chemtric, Inc., Rosemont, Ill.
Vapor Compression Distillation Module.
P. P. Nuccio. Jun 75, 197p NASA-CR-144424, REPT-3110
Contracts NAS9-13714, NAS9-14234

Descriptors: *Distillation equipment, *Space stations, *Vapor pressure, Metabolic wastes, Pumps, Storage tanks.

For abstract, see STAR 1322

6L. Medical and Hospital Equipment

AD-A016 541/5GA PC$3.25/MF$2.25
Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical Research
Fiberoptic Bronchoscopy in Acute Inhalation Injury,
John L. Hunt, Robert N. Agee, and Basil A. Pruitt, Jr. 1975, 9p
Presented at the Annual Session of the American Association for the Surgery of Trauma (34th), 17-19 Oct 74, Hot Springs, Va.
Availability: Pub. in Jnl. of Trauma, v15 n8 p641-649 Aug 75.

Descriptors: *Bronchi, *Fiber optics, Trauma, Inhalation, Smoke, Burns(Injuries), Mucous membranes, Optical scanning, Reprints.
Identifiers: *Bronchoscopy.

Fiberoptic bronchoscopy proved to be a simple, safe, and accurate method of diagnosing acute inhalation injury. Both the anatomic level and the severity of large airway injury were easily identified. The identification of a supraglottic and infraglottic component to inhalation injury was not only helpful in determining the appropriate therapy but also in predicting ultimate pulmonary complications. When bronchoscopy was used in conjunction with the Xe 133 scintiphotoscan, both large and small airway injuries could be identified. The only clinical situation where bronchoscopy failed to identify an inhalation injury was in the immediate postburn period if the patient was in hypovolemic shock. Yet if bronchoscopy is performed after hypovolemic shock has been corrected, mucosal changes characteristic of inhalation injury will be seen.

AD-A016 715/5GA PC$4.25/MF$2.25
Medin Corp Wallington N J
Development of an Air Evacuating, Gas Injecting Heat Sealing Machine.
Final rept.,
Herbert Schainholz. 28 Jun 74, 58p
Contract DADA17-73-C-3116

Descriptors: *Sterilizers, *Heat sealing, *Packaging, Equipment, Plastics, Vacuum.
Identifiers: Gas injection.

Equipment having capabilities of packaging supplies in plastic pouches under a vacuum was developed. In addition, the unit can be used as a gas sterilizing unit. The work has been based on the equipment patented under U.S. Patent no. 3,589,098, to which Medin has free and exclusive license.

COM-75-11376/1GA PC$4.25/MF$2.25
National Bureau of Standards, Washington, D.C. Dental and Medical Materials Section.
Properties and Interactions of Oral Structures and Restorative Materials.
Annual rept. 1 Jul 75-30 Jun 75,
J. M. Cassel. 31 Jul 75, 52p NBSIR-75-766
Contract PHS-DE-40015

Descriptors: *Dental materials, Polymers, Adhesives, Composite materials, Graft polymerization, Sealers, Dentistry.
Identifiers: Preventive dentistry, *Biomaterials.

A diversity of experimental approaches is being investigated to develop techniques which can be applied in formulation of adhesive restorative and caries-preventive dental materials. A newly developed testing procedure has demonstrated expected ranking of adhesive bond strengths within a group of selected coating agents, both coupling and release types. Deterioration on exposure to water of cohesive bond strength in the Bis-GMA matrix has been indicated without concurrent deterioration of the coupling agent. A monomer system with potential as a composite or pit and fissure sealant resin and giving a polymerizable liquid of desired viscosity at room temperature was derived from three low-melting, crystalline isomers of ether-ester linked aromatic dimethacrylates. A series of monomers of varying chemical structure was evaluated for possible application in photopolymerization experiments designed to investigate modification of hard tissue by grafting.

COM-75-50543/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Effect of Contact Lens Motion on the Oxygen Tension Distribution Under the Lens.
Final rept.,
Robert E. Berger. Jul 74, 16p
Sponsored in part by National Research Council, Washington, D.C.
American Jnl. of Optometry, v51 n7 p441-456 Jul 74.

Descriptors: *Lenses, Oxygen, Tension, Mathematical models, Hydrodynamics, Eye, Optical equipment.
Identifiers: Reprints, *Contact lenses, *Tears(Physiology).

A method of predicting the oxygen tension distribution under a contact lens is illustrated for some simple, but practical, lens motions. A hydrodynamic theory is used to find those regions which receive fresh tear fluid during a blink. Then a diffusion model is solved to find the oxygen tension distribution at all times between blinks. The results are compared with earlier models in which details of the fluid flow were neglected, as were variations of oxygen tension with position under the lens. Depending on the motion of the lens, the tear fluid exchange factor can be quite large without eliminating regions in which the oxygen tension is below critical levels. The results suggest that the situation can be improved if the lens is designed for large displacements, with the blink, in the direction parallel to the cornea.

COM-75-50563/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
A Proposed Specification for Acrylic Bone Cement.
Final rept.,
S. S. Haas, G. Dickson, and G. M. Brauer. 1975, 13p
Pub. in Jnl. of Biomedical Materials Research, v9 n6 p105-117 1975.

Descriptors: *Methacrylates, *Bones, *Cements, Mechanical properties, Specifications, Orthopedic equipment.
Identifiers: *Biomaterials, Reprints, *Methylmethacrylates.

A proposed specification covering handling characteristics and physical and chemical properties of bone cement composed primarily of methyl methacrylate has been prepared on the basis of data from the authors' studies and from various other sources. Under handling characteristics, requirements included relate to dough, handling and setting time, proper plasticity for insertion and temperature rise on setting. Mechanical properties specified include compressive strength and indentation and recovery characteristics. Maximum limits are proposed for water sorption and solubility. Suggested packaging requirements are also included.

N75-31714/9GA PC$3.75/MF$2.25
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering and Physiology and Biophysics.
Development of Ultrasonic Methods of Hemodynamic Measurements.
M. B. Histand, F. D. Mcleod, and C. W. Miller. 1 Aug 75, 37p NASA-CR-143458
Grant NSG-2009

Descriptors: *Flowmeters, *Hemodynamics, *Rheoencephalography, *Ultrasonics, Blood circulation, Blood vessels, Graphs (Charts), Reynolds number, Rheometers, Transducers, Velocity distribution.

For abstract, see STAR 1322

N75-31744/8GA PC$3.75/MF$2.25
Technology, Inc., Houston, Tex. Life Sciences Div.
Special Report: Occlusive Cuff Controller.
J. T. Baker. 1 Oct 75, 36p NASA-CR-144430
Contract NAS9-13291

Descriptors: *Blood flow, *Plethysmography, *Sphygmography, Bioastronautics, Electrocardiography, Leg (Anatomy), Pressure regulators, Space shuttles.

For abstract, see STAR 1322

PATENT-3 823 208 Not available NTIS
Department of the Navy Washington D C
Method of Making a Permanent Prosthetic Socket.
Patent,
Charles C. Asbelle, Michael F. Arrigo, and Gerald K. Porter. Filed 24 May 71, patented 9 Jul 74, 4p Rept nos. PAT-APPL-146 286,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Prosthetic devices, Fabrication, Methodology, Amputation stumps, Medical equipment, Bioengineering.
Identifiers: PAT-CL-264-22.

The invention relates to a method of making a permanent prosthetic socket wherein the amputee is supported by a casting fixture. Ultraviolet polymerizable material is applied directly to the amputee's stump over a polypropylene stockinet to form a permanent socket. A special clam-shell ultraviolet lamp is placed in position and the ultraviolet polymerizable material polymerized.

PATENT-3 905 356 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, Calif.
Subminiature Insertable Force Transducer.
Patent.

R. H. Silver, G. W. Lewis, C. Feldstein, and E. N. Duran. Patented 16 Sep 75, 6p PAT-APPL-470 429
Misc-Filed 15 May 1974. Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of patent available from Commissioner of Patents, Washington, D.C. 20231 $.50.

Descriptors: *Bioinstrumentation, *Force distribution, *Muscles, *Strain gages, *Transducers, Equipment specifications, *Patents, Tissues (Biology).
Identifiers: PAT-CL-128-2-S.

A sub-miniature transducer is described which is suitable for measuring forces at a predetermined location within muscle tissue; it includes a small diameter tube with a slit at the lower end that forms a pair of tines, and a strain gauge fixed within the tube to one of the tines for measuring slight deflections of the tine. The tube can be inserted into muscle tissue to measure forces at a location deep within the tissue and with minimal disturbance to the tissue, and the tube can be turned to any orientation to measure forces in different directions.

PB-245 272/0GA PC$7.00/MF$2.25
Cleveland Clinic Foundation, Ohio. Dept. of Artificial Organs.
Development and Evaluation of Cardiac Prostheses.
Annual rept. Jun 74-May 75,
Y. Nose, R. Krialy, G. Jacobs, C. Arancibia, and K. Nakiri. May 75, 190p NIH-N01-HV-4-2960-1
Contract N01-HV-4-2960

Descriptors: *Mechanical hearts, *Prosthetic devices, Design specifications, Medical equipment, Evaluation, Mathematical models, In vitro analysis, In vivo analysis, Anatomy, Cattle, Blood circulation, Heart, Surgical implantation.
Identifiers: *Cardiac assist devices, Ventricular assistance, *Blood pumps, Biomaterials.

The project involves the development and evaluation of left ventricular assist pumps and total artificial hearts utilizing biolized materials on the blood contacting surfaces. Tri-leaflet valves fabricated from human dura mater and diaphragms compression molded of Hexsyn, a high flex life rubber are used in both applications. During the current contract year, pneumatically driven devices were designed, fabricated, and evaluated in vitro and in vivo. Animal survival of up to 24 days with the first developmental total hearts indicated a feasible design. Acute experiments up to 3 days with the assist pump showed capability to pump the entire cardiac output while significantly lowering the left ventricular pressure. A mathematical model of the hemodynamics associated with a total artificial heart has been initiated to aid in the development of devices and control methods. The model shows excellent prediction of in vitro performance obtained with a unique apparatus utilizing the natural atria and vena cava removed from calves.

PB-245 680/4GA PC$5.75/MF$2.25
Alliance for Engineering in Medicine and Biology, Chevy Chase, Md.
A 5-Year Research and Development Agendum for Ultrasonic Imaging Diagnostic Instrumentation. An Assessment of Selected Medical Instrumentation.
Final rept.,
J. H. Busser. Apr 75, 127p* Pub-N-1975-1
NSF/RA/T-75/023
Grant NSF-ATA73-03255-A03
See also PB-230 010.

Descriptors: *Ultrasonic radiation, *Images, *Bioinstrumentation, Medical equipment, Signal processing, Diagnosis, Sound waves.
Identifiers: *Ultrasonic imaging, Medical research.

A priority list of research and development objectives in medical ultrasound has been assembled to indicate needed development of new capabilities in diagnosis over the next five years. Detailed rationale and the complex relationships between issues are given. The four previously published, discipline-oriented reports, from which the list was developed, are included in full as appendices. Thus, a complete background of information is provided for decision making in this field. The useful life of the report is expected to extend over a 3-5 year period.

6M. Microbiology:

AD-A016 324/6GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Microbiology
Utilization of Mixed Hydrocarbon Substrate by Petroleum-Degrading Microorganisms,
J. D. Walker, H. F. Austin, and R. R. Colwell. 28 Oct 74, 13p
Contract N00014-67-A-0239-0027
Availability: Pub. in Jnl. of General and Applied Microbiology, v21 p27-39 1975.

Descriptors: *Microorganisms, *Biodeterioration, *Petroleum products, *Oil pollution, *Water pollution, *Chesapeake Bay, *Alkanes, Bacteria, Yeasts, Fungi, Aromatic compounds, Reprints.

This report describes the first comparative study of petroleum-degrading yeasts, fungi, and bacteria, and their ability to degrade to mixed hydrocarbon substrate. The mixed hydrocarbon substrate employed contained aliphatic, alicyclic, aromatic, and polynuclear aromatic hydrocarbons. Most of the bacteria and all of the yeasts and fungi were isolated from Chesapeake Bay. Normal alkanes were found to be less susceptible to degradation by bacteria and yeasts as the carbon chain length of the hydrocarbon increased from 10 to 20. Results obtained for some of the fungi showed that there was little correlation between chain length of normal alkane and susceptibility to biodegradation. Cumene, naphthalene, phenanthrene, pristane, 1,2-benzanthracene, perylene, and pyrene were found to be degraded by microorganisms. In general the patterns observed for hydrocarbon utilization were similar for the bacteria, yeasts, and fungi. However, the utilization of hydrocarbons by individual isolates varied significantly. Such information may prove useful in assessing the hydrocarbon-degrading potential of microorganisms.

AD-A016 326/1GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Microbiology
Degradation of Petroleum by an Alga, 'Prototheca zopfii'.
Technical rept. 1972-1974,
J. D. Walker, R. R. Colwell, and L. Petrakis. 21 Jan 75, 5p
Contract N00014-67-A-0239-0027
Availability: Pub. in Applied Microbiology, v30 n1 p79-81 Jul 75.

Descriptors: *Algae, *Petroleum products, *Biodeterioration, *Oil pollution, *Water pollution, *Chesapeake Bay, Oils, Fuel oil, Hydrocarbons, Aromatic compounds, Saturated hydrocarbons, Marine biology, Reprints.
Identifiers: *Prototheca zopfii.

Prototheca zopfii is an achlorophyllous alga which degrades oil. It has been found to degrade 10 and 40% of a motor oil and crude oil, respectively, when tested under appropriate conditions. Degradation of the crude oil observed in this study compares well with the amount of degradation accomplished by bacteria. P. zopfii was found to degrade a greater percentage of the aromatic hydrocarbons in motor oil than of the saturated hydrocarbons and a greater percentage of saturated hydrocarbons in crude oil than of aromatic hydrocarbons. Resins and asphaltenes were produced during degradation of motor oil, whereas these fractions in crude oil were degraded. P. zopfii did not demonstrate preferential utilization of lower homologues of cycloalkanes and aromatics as has been observed with bacteria. (Author)

AD-A016 327/9GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Microbiology
Effect of South Louisiana Crude Oil and Number 2 Fuel Oil on Growth of Heterotrophic Microorganisms, Including Proteolytic, Lipolytic, Chitinolytic and Cellulolytic Bacteria.
Technical rept. 1972-1974,
J. D. Walker, P. A. Seesman, and R. R. Colwell. 1975, 22p
Contract N00014-67-A-0239-0027
Availability: Pub. in Environmental Pollution, v9 p13-33 1975.

Descriptors: *Microorganisms, *Bacteria, *Biodeterioration, *Petroleum products, *Oil pollution, *Water pollution, *Chesapeake Bay, Fuel oil, Oils, Yeasts, Fungi, Reprints.

Muddy Creek, a sub-estuary of the Rhode River in Chesapeake Bay, was examined to determine the susceptibility of the autochthonous microorganisms to South Louisiana crude oil and No. 2 fuel oil. Muddy Creek sediment was found to be free of contaminating oil. Crude and fuel oil induced little noticeable effect on the yeast and fungi populations, whereas the crude oil was found to support growth of bacteria and the fuel oil to limit such bacterial growth. Normalising the values with reference to the control culture revealed that both the crude and fuel oils were toxic for the bacteria. The crude oil showed greater toxicity. (Author)

AD-A016 328/7GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Microbiology
Bacterial Degradation of Motor Oil.
Technical rept. 1972-74,
J. D. Walker, R. R. Colwell, and L. Petrakis. 1975, 11p
Contracts N00014-69-A-0020-0006, N00014-67-A-0239-0027
Availability: Pub. in Jnl. of the Water Pollution Control Federation, v47 n8 p2058-2066 Aug 75.

Descriptors: *Bacteria, *Microorganisms, *Biodeterioration, *Petroleum products, *Oil pollution, *Water pollution, Hydrocarbons, *Chesapeake Bay, Waste water, Reprints.

This study examines the disposition of motor oil, the type of petroleum likely to be associated with nearshore discharges and wastewater effluent. Motor oil was subjected to degradation by naturally occurring microbial populations cultered under conditions promoting optimum degradation and simulating the natural environment. Two stations in the Chesapeake Bay were sampled to obtain microorganisms capable of degrading motor oil, Eastern Bay, which is a relatively unpolluted region, and Colgate Creek in Baltimore Harbor, Md, which is continuously contamined with petroleum. It may be said that oil discharged with effluent of wastewater treatment plants will be susceptible to microbial degradation. Microorganisms present in the water column will most probably degrade more oil than will the microbial population present in sediment samples collected at the same site. (Author)

AD-A016 367/5GA PC$3.25/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va

Study of an Anthrax Protective Antigen,
N. I. Aleksandrov, N. E. Gefen, V. F. Runova, Yu. V. Ezepchuk, and A. I. Seregina. 24 Feb 75, 11p
Rept no. FSTC-HT-23-0056-75
Trans. of Vaktsiny i Syvorotki: Materialy po Proizvodstvu (USSR) n12 p83-89 1970.

Descriptors: *Vaccines, *Antigens, *Bacillus anthracis, *Immunology, Bacteria, Immunity, Biological products, Experimental data, Laboratory animals, Dosage, Bioassay, Toxins and antitoxins, USSR, Translations, Culture media, Cultures(Biology), In vitro analysis, In vivo analysis, Production.
Identifiers: *Anthrax.

The antigen is said to be one of three components of an extracellular toxin produced by the anthrax agent. It is produced by incubation in a milk-peptone medium. Data are presented on tests on white mice, guinea pigs, rabbits, sheep and monkeys, indicating it is equal to or better than live STI vaccine.

AD-A016 501/9GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Microbiology
Some Effects of Petroleum on Estuarine and Marine Microorganisms.
Technical rept. 1972-1974,
J. D. Walker, and R. R. Colwell. 18 Jul 74, 12p
Contract N00014-67-A-0239-0027
Availability: Pub. in Canadian Jnl. of Microbiology, v21 n3 p305-313 1975.

Descriptors: *Microorganisms, *Bacteria, *Petroleum products, *Biodeterioration, *Oil pollution, *Water pollution, *Chesapeake Bay, Estuaries, Marine biology, Sediments, Contamination, Ecology, Cultures(Biology), Substrates, Yeasts, Fungi, Hydrocarbons, Reprints.

Degradation of mixed hydrocarbon substrate in a system comprising water from an environment relatively free of oil and a sediment inoculum from an oil-contaminated site was significantly greater than when sediment from the non-oil-contaminated environment served as inoculum. Mixed hydrocarbon substrate, however, was observed to have a limiting effect on the growth of autochthonous bacteria from the non-oil-contaminated estuarine source. Growth and cell yield were similarly reduced when marine sediment bacteria were cultured in seawater supplemented with mixed hydrocarbon substrate. The addition of a South Louisiana crude oil or a No. 2 fuel oil to water and sediment collected from a marsh area of Chesapeaka Bay showed no limiting effects on growth of the total heterotrophic microbial flora when examined over a 28-day period. However, results of these studies indicate that the effects of petroleum on microorganisms should be examined carefully under conditions closely approximating those in situ. (Author)

AD-A016 502/7GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Microbiology
Deep-Sea Bacteria: Growth and Utilization of n-Hexadecane at in Situ Temperature and Pressure.
Technical rept.,
J. R. Schwarz, J. D. Walker, and R. R. Colwell. 30 Aug 74, 8p
Contract N00014-67-A-0239-0027
Availability: Pub. in Canadian Jnl. of Microbiology, v21 n5 p682-687 1975.

Descriptors: *Bacteria, *Biodeterioration, *Hexadecane, *Water pollution, *Deep oceans, *Oil pollution, Pseudomonas, Pseudomonadaceae, Vibrio, High pressure, Low temperature, Florida, Coastal regions, Marine biology, Hydrocarbons, Petroleum products, Chromatographic analysis, Reprints.

A mixed culture of bacteria was obtained from the sediment-water interface of a core sample taken off the coast of Florida at depth of 4940m. The mixed culture was found capable of utilizing n-hexadecane as a sole carbon source for growth at the in-situ temperature (4C) and pressure (500 atm). The rate of utilization under deep-ocean conditions was found to be much slower than the rate observed at ambient pressure (1 atm) and low temperature (4C). (Author)

AD-A016 507/6GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Microbiology
Petroleum-Degrading Achlorophyllous Alga Prototheca zopfii,
J. D. Walker, R. R. Colwell, Z. Vaituzis, and S. A. Meyer. 17 Oct 74, 2p
Availability: Pub. in Nature, v254 n5499 p243-424, 3 Apr 75.

Descriptors: *Algae, *Petroleum products, *Biodeterioration, *Oil pollution, *Water pollution, *Chesapeake Bay, Hydrocarbons, Bays, Maryland, Contamination, Oils, Cultures(Biology), Marine biology, Reprints.
Identifiers: *Prototthecazopfii, Eastern Bay.

One of the objectives of this research programme is to enumerate and identify petroleum-degrading microorganisms occurring in Chesapeake Bay, to assess the potential of these microorganisms to degrade petroleum in vitro and in situ and to determine the types of petroleum degraded. Two locations in Chesapeake Bay are sampled at monthly intervals. One is Colgate Creek, an oil-contaminated site in Baltimore Harbour, the other is an area south of Parson's Island in Eastern Bay, a non-polluted shellfish harvesting region of Chesapeake Bay. The presence of petroleum in Colgate Creek and its absence in Eastern Bay has been confirmed by computerised low-resolution mass spectrometry analysis of benzene extracts of sediments collected at both sites. During April and May 1973, and again in 1974, an unusual organism, believed to be an algal species, was isolated from sediment of Colgate Creek. Corresponding isolates have not been isolated from Eastern Bay. The significant feature of our isolate is that it degrades petroleum hydrocarbons. When the organism was grown in 100 ml estuarine salts solution overlaid with 1% (v/v) of a South Louisiana crude oil, significant degradation of the oil was observed, after 30 d of incubation at 25 C in quiescent culture, compared with the uninoculated, weathered control sample of oil. The isolate has been identified as Prototheca zopfii. As well as crude oil, the isolate utilised petroleum hydrocarbons in a 17-component mixed hydrocarbon substrate.

AD-A016 549/8GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Ultrastructure of 'Trypanosoma duttoni'.
Medical research progress rept.,
Lorrita P. Watson, and Clarence M. Lee. 27 Dec 74, 9p
Availability: Pub. in Zeitschrift fuer Parasitenkunde, 46 p133-140 1975.

Descriptors: *Trypanosoma, *Morphology(Biology), *Cells(Biology), Protozoa, Parasites, Mice, Reprints.
Identifiers: *Trypanosoma duttoni, Ultrastructure.

Trypanosoma duttoni exhibits the typical trypanosome morphology in that it is bounded by a unit membrane which includes its anterior flagellum; it is surrounded by a framework of subpellicular fibrils, and it contains a nucleus and the posteriorly located kinetoplast-blepharoplast structures along with cytoplasmic organelles (mitochondria, Golgi, and endoplasmic reticulum). Very prominently displayed in T. duttoni is the contractile vacuole, which has not previously received wide-spread recognition. The kinetoplast is clearly continuous with mitochondria in some cases. Inclusion bodies are categorized into three distinct types, none of which can be conclusively designated as the very popular volutin granules, without cytochemical evidence. The existence of a third tubule among peripheral tubule doublets of the flagellum is observed. (Author)

PATENT-3 826 613 Not available NTIS
Department of the Navy Washington D C
Detection and Titration of Viruses and Antibodies Using Latex.
Patent,
Gokaldas C. Parikh, and Thomas C. Sorensen.
Filed 6 Mar 73, patented 30 Jul 74, 5p Rept nos. PAT-APPL-338 495,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Serology, *Viruses, Antibodies, Assaying, Detection, Quantitative analysis, Latex, Adsorption, Methodology.
Identifiers: PAT-CL-23-230-B.

The invention relates to the detection of viruses and antibodies and especially to a universal and unique method of counting and assaying virus particles or antibody molecules. The adsorption of the virus particles or antibody molecules on latex causes agglutination of the latter. The types and amount of agglutination can be determined by using a Coulter Counter. From the sizes and the amounts of the specific aggregates formed, the type and quantity of virus particles or antibody molecules can be determined by comparison with data for known samples.

60. Pharmacology

AD-A016 800/5GA PC$3.25/MF$2.25
Armed Forces Radiobiology Research Inst Bethesda Md
Histamine-Induced Hypotension Modified by H1 and H2 Antagonists.
Scientific rept.,
T. F. Doyle, and T. A. Strike. Jun 75, 16p Rept no. AFRRI-SR75-17

Descriptors: *Antihistaminics, *Hypotension, Blood pressure, Histamine, Chemoreceptors, Rhesus monkeys, Dosage, Effectiveness, Response(Biology).
Identifiers: Chlorpheniramine, Pyrilamine, Burimamide.

The hypotensive response of monkeys to exogenous histamine was measured when the histamine was given without antagonist, after chlorpheniramine (10 mg/kg) or mepyramine (10 mg/kg), and after these two antagonists in combination with burimamide (20 mg/kg). The dose of histamine needed to elicit a 50 percent maximal response was: without antagonist, 0.115 micrograms/kg; after chlorpheniramine, 13.5 micrograms/kg; after chlorpheniramine and burimamide, 23.5 micrograms/kg; after mepyramine, 23.0 micrograms/kg; and after mepyramine and burimamide, 55.0 micrograms/kg.

JPRS-65820 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Effect of Psychotropic Drugs on Brain Structures,
E. N. Papova, G. N. Krivitskaya, V. F. Matveev, and V. S. Vorobev. 1 Oct 75, 22p
Trans. of Zhurnal Nevropatologii i Psikhiatrii (USSR) n7 p1064-1069 1975.

Descriptors: *Psychoneuropharmacology, *Brain, *Cerebral cortex, Lysergic acid diethylamide, Psychedelic agents, Central nervous system, Pharmacology, Drugs, Histology, Cytology, Electron microscopy, Pathology, Pathophysiology, Tranquilizer drugs, USSR, Translations.
Identifiers: *Psychotropic agents, Neuroanatomy, Neurophysiology, Haloperidol.

Contents:
Influence of some psychotropic drugs on brain structures;
Some features of neuron ultrastructure in the cerebral cortical motor area under the influence of lizergamid (LSD) and haloperidol.

6P. Physiology

AD-A016 304/8GA PC$3.25/MF$2.25
Boston Univ Mass School of Medicine
Endocrine and Pulmonary Response to Hemorrhagic Shock.
Annual progress rept. 1 Sep 74-31 Aug 75,
Richard H. Egdahl, and Herbert B. Hechtman.
31 Aug 75, 20p
Contract DADA17-67-C-7149
See also report dated 31 Aug 74, AD-A004 107.

Descriptors: *Hemorrhagic shock, *Endocrine glands, *Lung, *Hormones, *Metabolism, Musculoskeletal system, Glucose, Amino acids, Septicemia, Physiology, Pathology, Heart, Cardiovascular system, Experimental data, Monkeys, Laboratory animals.

The roles of adrenal and pancreatic hormones in modulating the metabolic abnormalities which occur following hemorrhagic shock with resuscitation, have been studied using rhesus monkeys. Data are given on skeletal muscle glucose and amino acid metabolism, insulin sensitivity for the shock induced adrenal steroid and epinephrine response in conditioning the subsequent metabolic abnormalities. Data on the pancreatic hormones are still incomplete, but preliminary inspection suggests a similar failure of changes in these hormones to account for post-shock metabolic abnormalities. Endothelial cell (EC) damage has been identified as a major factor associated with acute respiratory failure. Studies of the mechanics of breathing indicate that the reductions in cardiac output which so frequently occur with positive and expiratory pressure (PEEP) may be secondary to left ventricular failure.

AD-A016 505/0GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Measurement of Tremor in the Makai Range 520-Foot Saturation Dive.
Medical research progress rept.,
A. J. Bachrach, D. R. Thorne, and K. J. Conda.
1971, 7p
Availability: Pub. in Aerospace Medicine, v42 n8 p856-860 Aug 71.

Descriptors: *Saturation diving, Muscles, Physiological effects, Deep diving, Decompression, Signs and symptoms, Aquanauts, Signatures, Monitoring, Reprints.
Identifiers: *Tremor.

Muscle tremor was measured on three aquanauts using a muscle force transducer developed to measure response variation within a specified force band. Tests were made during the 12-hour compression to 520-feet at 40 feet per hour, and during the 5-day decompression. Analysis of the power spectra revealed significant and stable differences among individuals, but in all cases tremor magnitude was within normal surface limits. Although there was a tendency for high frequency tremor components to drop out with higher pressures, neither total tremor nor the amount of tremor within particular frequency bands showed a significant systematic change with pressure. The stability of the differences among the divers may allow for the establishment of individual tremor 'signatures' as a monitoring standard. (Author)

AD-A016 542/3GA PC$3.25/MF$2.25
Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical Research
Alterations in Hypothalamic Function Following Thermal Injury,
Douglas W. Wilmore, Thomas W. Orcutt, Arthur D. Mason, Jr., and Basil A. Pruitt, Jr. 1975, 7p
Presented at the Annual Session of the American Association for the Surgery of Trauma (34th), 17-19 Oct 74, Hot Springs, Va.
Availability: Pub. in Jnl. of Trauma, V15 n8 p697-703 Aug 75.

Descriptors: *Burns(Injuries), *Metabolism, *Hypothalamus, Homeostasis, Body temperature, Patients, Humans, Hormones, Growth substances, Skin(Anatomy), Glucose, Blood chemistry, Reprints.
Identifiers: Comfort.

Hypermetabolism characterizes the metabolic response to thermal injury, and the increase in metabolic rate is related to increased elaboration of catecholamines. Elevated levels of epinephrine and norepinephrine provide a hormonal environment which favors substrate mobilization and increased energy utilization associated with accelerated excretion of urinary nitrogen and loss of body weight. The present study examines several aspects of hypothalamic function in order to determine the role of the central nervous system in directing the metabolic response to injury.

AD-A016 546/4GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
X-Linked B-Lymphocyte Immune Defect In CBA/N Mice. II. Studies of the Mechanisms Underlying the Immune Defect.
Medical research progress rept.,
Irwin Scher, Alfred D. Steinberg, Alice K. Berning, and William E. Paul. 27 May 75, 15p
See also 1, AD-A015 481.
Availability: Pub. in Jnl. of Experimental Medicine, v142 p637-650 1975.

Descriptors: *Immunity, *Antigen antibody reactions, *Lymphocytes, *Genetics, Deficiencies, Antibodies, Thymus, Spleen, Malfunctions, Growth(Physiology), Mice, Children, Response(Biology), Reprints.
Identifiers: Immune deficiency.

The mechanisms underlying the X-linked B lymphocyte functional defect in the CN mice and their F sub 1 progeny were studied. Immune defective mice were unable to respond to the T-independent antigen DNP-lys-Ficoll but were able to form antibody against the highly cross-reactive hapten (TNP) when it was coupled to an erythrocyte carrier. Immune defective CN X DN F sub 1 male mice, which do not normally respond to T-independent antigens, were able to respond to both poly I-C and DNP-lys-Ficoll after the administration of CN x DN F sub 1 female spleen cells even after these cells had been depleted of T lymphocytes. In addition, it was shown that the inability of the CN mice and their F sub 1 progeny to respond to T-independent antigens was not due to an intrinsic abnormality of their microenvironment or the suppressive actions of a T lymphocyte. These data present evidence that the X-linked defect in the CN mice is due to an intrinsic defect in B lymphocyte development.

AD-A016 645/4GA PC$3.25/MF$2.25
Louisiana State Univ Medical Center New Orleans Dept of Physiology
Alterations of FFA Glucose and Lactate Metabolism in Shock.
Rept. for 1 Sep 74-31 Aug 75,
John J. Spitzer. Oct 75, 9p
Contract N00014-74-A-0054-0002

Descriptors: *Shock(Pathology), *Metabolism, *Fatty acids, *Lactates, *Glucose, Heart, Insulin, Phospholipids, Hormones.

The major metabolic alterations during shock have been studied in detail. The importance of the elevated lactate concentration in influencing oxidative metabolism has been emphasized. This change is probably responsible, at least in part, for the alteration in myocardial metabolism found previously during shock. Phospholipid changes have also been studied with special reference to phospholipids and especially to phosphatidylglycerol. The metabolism of phosphatidylglycerol is quite unique during shock and the importance of red blood cells as well as plasma in producing the alterations have been pointed out. More recent investigations point to important hormonal alterations during shock. Some of these have been investigated in detail and especially the role of insulin release by hyperglycemia was found to be altered during shock.

AD-A016 711/4GA PC$3.25/MF$2.25
Naval Health Research Center San Diego Calif
Classical Conditioning of Autonomic Responses in Alert and Drowsy Subjects,
David G. McDonald , and Laverne C. Johnson.
15 Apr 75, 15p Rept no. 74-62
Availability: Pub. in Biological Psychology, v3 p101-112 1975.

Descriptors: *Autonomic nervous system, *Response(Biology), *Sleep, Alertness, Galvanic skin response, Electroencephalography, Plethysmography, Heart, Reprints.

The primary purpose of this experiment was to study classically conditioned autonomic responses of alert versus drowsy subjects. Sixty-nine subjects in conditioning and pseudoconditioning groups were subdivided into alert and drowsy groups on the basis of EEG recordings during conditioning trials, giving a total of four groups: conditioning-alert, conditioning-drowsy, pseudoconditioning-alert, and pseudoconditioning-drowsy. Using the latency criterion to define responses, significant conditioning occurred only in the conditioning-alert group for the following: Skin resistance anticipatory and UCS-omission responses, and finger plethysmograph anticipatory response. Both conditioning groups showed evidence of conditioned UCS-omission plethysmograph responses. Discussion centered primarily on the importance of including EEG recording in studies of classically conditioned autonomic responses. The relationship between the various responses was also evaluated. (Author)

AD-A016 750/2GA PC$3.25/MF$2.25
Hahnemann Medical Coll and Hospital Philadelphia Pa Dept of Physiology and Biophysics
Effects of Coronary Hypotension on Myocardial Substrate Utilization,
John J. Spitzer, A. A. Bechtel, L. T. Archer, M. R. Black, and L. J. Greenfield . 15 Mar 74, 4p
Contract N00014-72-A-0317, Grant PHS-HL-15037.
Prepared in cooperation with Louisiana State Univ. Medical Center, New Orleans. Dept. of Physiology and Oklahoma Univ. Health Science Center, Oklahoma City.
Availability: Pub. in American Jnl. of Physiology, v228 n2 p365-368 Feb 75.

Descriptors: *Myocardium, *Fatty acids, *Lactates, *Metabolism, Blood flow, Heart, Oxygen, Hypotension, Glucose, Reprints.

Changes in myocardial substrate utilization were studied after experimental coronary hypotension in the isolated dog heart perfused with the blood of a large donar animal. After a control period (100 mmHg) the afterload of the isolated heart was adjusted to 50 mmHg and kept at that level for 4 h. After this period, a second control observation was made at a 100-mmHg afterload. Coronary sinus blood flow and oxygen consumption decreased during hypotension and returned to normal during the second control period. Myocardial free fatty acid (FFA) uptake and oxidation did not change significantly. Lactate uptake and the percentage of CO2 derived from myocardial lactate utilization were both diminished during hypotension. These changes were not present during the second control period. Glucose uptake and myocardial respiratory quotient were decreased during the hypotensive period. Half the hearts exhibited elevated end-diastolic pressure after hypotension, but no metalbolic differences were detectable between the failing and nonfailing hearts. Thus, prolonged severe hypotension caused a relative perference of FFA oxidation and diminished lactate and glucose uptakes by the myocardium.

AD-A016 793/2GA PC$6.25/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
Toward a Constitutive Equation for Blood.
Doctoral thesis,
Steven Deutsch. 17 Jun 75, 160p Rept no. TM-75-184
Contract N00017-73-C-1418

Descriptors: *Blood flow, *Rheology, *Fluid mechanics, Viscoelasticity, Mathematical models, Biophysics, Theses.
Identifiers: Couette flow.

Closure of the conservation equations of fluid mechanics requires a constitutive equation. Viscometric measurements are not sufficient to uniquely determine such an equation. This study was undertaken to determine a constitutive equation for blood by the comparison of theoretical and experimental results for the problem of the stability of circular Couette flow. Based on the literature, a four constant Oldroyd model equation was chosen as a constitutive candidate for blood. Theoretical examination of the model in simple flow situations showed that it was capable of qualitatively predicting many of the observed characteristics of blood. Comparison of theory and experiment showed that the Oldroyd model was insufficient to characterize the rheological behavior of blood. The failure of the equation was most likely due to the oversimplicity of the linear model from which it was derived.

AD-A016 886/4GA PC$3.75/MF$2.25
Army Aeromedical Research Lab Fort Rucker Ala
Object Visibility Patterns in Low Level Flight.
Final rept.,
Robert H. Wright, and J. Nicholas DeBonis. Sep 75, 36p Rept no. USAARL-76-5

Descriptors: *Visual perception, *Flight paths, *Pilots, *Low level, Masking, Terrain, Vegetation, Surface targets, Low altitude, Line of sight, Angles, Time, Navigation, Trees, Visual targets, Images, Visibility, Patterns.

Line of sight viewing angle, range and time distributions are given for a 70 kilometer sample of tree-top level annular (fisheye) imagery, and comparison made between these data and theoretical random single tree line of sight distributions. The effects of location over open and tree covered terrain are assessed, and limited data on the effect of altitude presented. Relative azimuth, elevation and range of objects when they first emerged into view were recorded by type of object. Relative angle of crossing linear features was determined, along with the duration that information of navigational value could be determined. When over trees the actual masking function was grossly different from the theoretical curves, while over open terrain actual masking approximated the five percent cover theoretical curve at close range and the one percent curve at 1000 meters. Over trees, masking for tank-size vehicles ranged from 83 to 93 percent, and over open terrain from 10 to 77 percent masking. Only 12.5 percent of linear features were found to be oriented within plus or minus 30 degrees of the nose at crossing, while 58.3 percent were within plus or minus 30 degrees of perpendicular to the nose. This finding implies viewing to the sides as an aircraft crosses features is necessary in order to see the feature details that will provide positive geographic orientation. The detailed viewing along linear features required for positive geographic orientation was available for an average of 24 meters, or one second at 50 knots. Limited data are presented on the effect of altitude on duration of line of sight to objects that provide information of value in geographic orientation. (Author)

JPRS-65804 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Problem of the Neurodynamic Code of Mental Phenomena,
D. I. Dubrovskii. 30 Sep 75, 22p
Trans. of Voprosy Filosofii (USSR) n6 p85-99 1975.

Descriptors: *Brain, *Central nervous system, *Cognition, Reasoning, Thinking, Physiology, Human behavior, Translations, USSR.
Identifiers: *Neurophysiology, *Information processing(Psychology).

The report contains a discussion of the problem of the neurodynamic code of mental phenomena which deals with the philosophical, psychological, cybernetic and ethical aspects of investigation of the brain and its mental functions.

JPRS-65807 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Method of Studying Slow Electric Processes in the Human Brain in Different Ranges of the Recorded Signal Magnitude,
V. I. Ilyukhina. 30 Sep 75, 11p
Trans. of Fiziologicheskii Zhurnal SSSR, v61 n7 p1090-1094 Jul 75.

Descriptors: *Bioelectricity, *Brain, *Central nervous system, *Electroencephalography, *Electrodes, Implantation, Electrophysiology, USSR, Translations.
Identifiers: Neurophysiology.

In studying the dynamics of slow electric processes (SEP) in the brain, up to now there have been no uniform standards in terms of choosing the material and the sizes of the electrodes used for recording, the position of the indifferent electrode, and, finally, the choice of current amplifiers which would make it possible to reproduce the studied processes without substantial distortions. The report discusses various procedures and equipment as related to the problems.

6R. Radiobiology

AD-A016 459/0GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Effect of 19 MHz RF Radiation on Neurotransmitters in Mouse Brain.
Interim rept. Nov 74-Feb 75,
James H. Merritt, and James W. Frazer. Aug 75, 8p Rept no. SAM-TR-75-28

Descriptors: *Neurochemistry, *Electromagnetic radiation, *Radiation effects, *Neuromuscular transmission, *Brain, Radiobiology, High frequency, Central nervous system, Dopamine, Serotonin, Amines, Mice, Experimental data, Vanillic acids.
Identifiers: Norepinephrine, Indole acetic acid/5-hydroxy.

Mice were exposed to 19 MHz radiofrequency radiation and then euthanized by microwave-heating brain inactivation. Brain levels of 5-hydroxyindole acetic acid (5HIAA), homovanillic acid (HVA), serotonin (5HT), norepinephrine (NE), and dopamine (DA) were not altered by this radiation. Brain concentration of 5HIAA, 5 HT, NE, and DA was higher when control animals were euthanized by microwave inactivation than by cervical dislocation.

AD-A016 801/3GA PC$3.25/MF$2.25
Armed Forces Radiobiology Research Inst Bethesda Md
Radiation-Released Histamine in the Rhesus Monkey as Modified by Mast Cell Depletion and Antihistamine.
Scientific rept.,
T. F. Doyle, and T. A. Strike. Jun 75, 14p Rept no. AFRRI-SR75-18

Descriptors: *Radiobiology, *Histamine, Mast cells, Depletion, Antihistaminics, Rhesus monkeys, Catabolism, Radiation dosage, Hypotension, Response(Biology), Concentration(Chemistry), Blood chemistry, Blood pressure, Gamma rays, Neutron irradiation.
Identifiers: Chlorpheniramine.

Changes in blood histamine concentrations of rhesus monkeys were measured after a 4000-rad dose of mixed gamma-neutron radiation. All animals were pretreated with aminoguanidine to retard histamine catabolism. Histamine concentrations increased from 26 + or - 13.5 to 235 + or - 16 ng/ml after irradiation. When the animals were pretreated with an antihistamine, chlorpheniramine (3 mg/kg), histamine concentrations changed from 25.7 + or - 13.5 to 462 + or - 226 ng/ml after irradiation. When the monkeys were pretreated with a specific mast cell histamine depleter, compound 48/80 (1mg/kg per day) for four consecutive days and then irradiated (4000 rads), histamine concentrations did not change significantly. When 48/80 was given 20 min after irradiation, histamine concentrations changed from 18 + or - 2 ng/ml to a maximum of 35 + or - 9 ng/ml after 48/80 injection. (Author)

COM-75-50562/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Behavioral Suppression by 383-MHz Radiation.
Final rept.,
R. J. Cunitz, W. D. Galloway, and C. M. Berman. Mar 75, 4p
Sponsored in part by Environmental Agency, Washington, D.C.
Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-23 n3 p313-316 Mar 75.

Descriptors: *Radiation effects, *Radiobiology, *Animal behavior, Microwaves, Monkeys, Dose rate, Neurochemistry, Exposure, Responses.
Identifiers: *Microwave radiobiology.

Two rhesus monkeys were irradiated in a 383 MHz resonant cavity immediately before and during performance of a four-choice, forced-choice serial reaction task. Integral dose rates of .001 through 17.5 W were delivered to the head. No effects were observed below a critical dose level (about 23 W/kg) derived from integral dose rate and body mass. Above this level, behavioral suppression occurred, i.e., correct response rate was profoundly altered.

The effect was completely reversible and repeatable in one of the subjects - the other subject did not recover completely and was sacrificed for histological examination which revealed no gross or microscopic damage. The nature of the effect suggests a neurochemical rather than an electrical or mechanical basis for the results.

JPRS-65506-1 PC$6.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Microwaves and Human Safety. Part I,
B. A. Minin. 20 Aug 75, 153p
Trans. of mono. SVCh i Bezopasnost Cheloveka, Moscow, 1974 p1-349.

Descriptors: *Health physics, *Electromagnetic radiation, *Industrial hygiene, Superhigh frequencies, Microwaves, High frequencies, Biophysics, Radiation protection, Radiation dosage, Irradiation, Exposure, Humans, USSR, Translations.
Identifiers: *Microwave radiobiology, Electromagnetic radiation hazards, Occupational safety and health.

Contents:
Earth's electromagnetic biosphere, nature and ecology;
Biophysics of superhigh frequency effects, methods for studying harmful aftereffects;
Setting of norms for electromagnetic fields;
Methods for predicting irradiance.

JPRS-65506-2 PC$7.00/MF$2.25
Joint Publications Research Service, Arlington, Va.
Microwaves and Human Safety. Part II,
B. A. Minin. 20 Aug 75, 200p
Trans. of mono. SVCh i Bezopasnost Cheloveka, Moscow, 1974 p1-349. See also JPRS-65506-1.

Descriptors: *Electromagnetic radiation, *Superhigh frequencies, *Health physics, *Industrial hygiene, Dosimetry, Radiation dosage, Humans, USSR, Radiation protection, Translations, Maintenance, Predictions, Microwaves.
Identifiers: Occupational safety and health, Microwave radiobiology, Electromagnetic radiation hazards.

Contents:
Principles and practice of radio prediction;
Techniques of radio measurements, apparatus and methods;
Techniques for protection against electromagnetic superhigh-frequency fields.

6S. Stress Physiology

AD-A016 451/7GA PC$3.25/MF$2.25
Naval Medical Field Research Lab Camp Lejeune N C
Predicting the Rectal Temperature Response to Heat Stress.
Medical research progress rept. no. 1,
Garold K. Osborn, and Harold W. Carroll. Oct 75, 19p Rept no. NMFRL-Vol-XXV-No-11

Descriptors: *Heat stress(Physiology), *Body temperature, Rectum, Response(Biology), Acclimatization, Predictions, Equations, Numerical analysis.
Identifiers: *Rectal temperature.

The accuracy of Givoni-Goldman's equations and of the power function equation Y = a(X sup b) for the prediction of rectal temperature was determined for a sample of Marine troops undergoing different levels of heat strain. The equations of Givoni-Goldman, developed to be applied to heat-acclimatized men, were more accurate in their prediction when the observed values of rectal temperature were above rather than below 38.5C. The effect of heat conditioning was to increase the difference between predicted and observed values so that the latter tended to be overestimated. When the rectal temperature-time response curve was projected, by means of the power function equation, to later time points from values measured at three time points early in the exposure, the projected values tended to be lower than observed values for subjects experiencing higher degrees of heat strain. While more than 50% of the differences between observed and projected values were less than 0.5C, yet such individual differences could be as large as 1C.

AD-A016 485/5GA PC$7.00/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Investigation of Inertial Properties of the Human Body.
Final rept. Apr 72-Dec 74,
R. F. Chandler, C. E. Clauser, J. T. McConville, H. M. Reynolds, and J. W. Young. Mar 75, 178p Rept no. AMRL-TR-74-137 DOT-HS-801 430
Contract DOT-HS-017-2-315

Descriptors: *Biomechanics, *Anthropometry, *Inertia, Humans, Mass, Mathematical models, Impact shock, Protective equipment, Human factors engineering.
Identifiers: *Biodynamics, Design, DOT/5H.

Knowledge of the anthropometric parameters of the human body is essential for understanding of the human kinetics and particularly for the design and testing of impact protective systems. Considerable information is available on the size, weight and center of mass of the body and its segments. This report supplements existing information with data regarding mass distribution characteristics of the human body as described by the principal moments of inertia and their orientation to body and segment anthropometry. The weight, center of mass location and principal moments of inertia of six cadavers were measured, the cadavers were then segmented and the mass, center of mass, moments of inertia and volume were measured on the fourteen segments from each cadaver. Standard and three-dimensional anthropometry of the body and segments was also determined.

AD-A016 593/6GA PC$7.50/MF$2.25
State Univ of New York At Buffalo Dept of Physiology
Man - Water - Pressure. Volume II. Publications in Underwater Physiology.
Report for 1967-1974,
Edward H. Lanphier, and Hermann Rahn. Mar 75, 229p
Contract N00014-71-C-0342

Descriptors: *Hyperbaric conditions, *Stress(Physiology), *Diving, Test facilities, Respiration, Reflexes, Response(Biology), Cells(Biology), Gas exchange(Biology), Oxygen, Toxicity.
Identifiers: Oxygen toxicity.

Contents:
Chamber facilities;
Human respiration;
Submersion;
Reflex responses;
Cellular changes;
Gas pockets;
Oxygen toxicity;
Exposures to pressures;
Gaseous diffusion.

AD-A016 980/5GA PC$3.75/MF$2.25
Naval Aerospace Medical Research Lab Pensacola Fla
Measurement of Mass Distribution Parameters of Anatomical Segments,
Edward B. Becker. Oct 73, 34p Rept no. NAMRL-1193
Pub. in Stapp Car Crash Conference p 45, Society of Automotive Engineers, Inc. Jan 73.

Descriptors: *Biodynamics, *Anatomical models, *Biomechanics, *Moment of inertia, *Center of gravity, Mathematical models, Humans, Head(Anatomy), Neck(Anatomy), Equipment, Measurement, Methodology.

Procedures to determine the center of mass and the moments of inertia in three dimensions of previously defined anatomical segments are presented. As an illustration, these procedures are applied to the human head and head-and-neck. The results of measurements made on six human heads and three head-and-necks are presented and discussed.

JPRS-65796 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Post-Hypnotic Realization of Subjective Experience of Partial Weightlessness in Modelling a Program of a 3-Day Space Flight,
L. P. Grimak, and L. S. Khachaturyants. 30 Sep 75, 15p
Trans. of Zhurnal Vysshei Nervnoi Deyatelnosti (USSR) v24 n5 p899-906 1974.

Descriptors: *Stress(Physiology), *Weightlessness, *Motor reactions, *Aerospace medicine, Space flight, Hypnosis, Space environment simulation, Gravity, Experimental data, Humans, Physiological psychology, Translations, USSR.

The report contains experimental data on the post-hypnotic realization of subjective experience of partial weightlessness in modelling a program of a three-day space flight. Conclusions were as follows: (1) The effectiveness of a single suggestion under hypnosis of a subjective sensation of reduced weightiness of the body is preserved uninterrupted for a course of three days. The suggested state not only may not regress with time but, on the contrary, displays a tendency to be 'preformed' and fixed firmly. (2) Subjective feelings of reduced weightiness of the body cause an entire series of psychophysiological and motor-coordination changes and approximate, to a considerable degree, those which occur during actual weightlessness.

JPRS-65911 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Peculiarities of the Reaction of the Auditory Analyzer in Man in Prolonged Action of Noise, in the Aspect of Space Medicine,
E. I. Matsnev, and I. Ya. Yakovleva. 10 Oct 75, 10p
Trans. of Vestnik Oto-Rino-Laringlogii (USSR) n3 p40-46 1975.

Descriptors: *Stress(Physiology), *Noise(Sound), *Aerospace medicine, *Stress(Psychology), *Hearing, Space flight, Astronauts, Audiometry, Auditory perception, Auditory masking, USSR, Translations, Life support systems.

Data are reported on research on the functional state of the auditory analyzer of three volunteers (physician, biologist, technician) subjected to prolonged continuous effect of noise generated by a complex life-support system in conditions of a year-long medical-technical experiment. The general characteristics of the life-support system and the experimental design were reported in detail in the work of A. I. Burnazyan and coauthors (1969). The basic sources of noise in the hemochamber were the self-contained blocks of the atmosphere purifi-

cation system, air-conditioning equipment and the life,support system ventilator. Measurements of noise levels and analysis of spectral characteristics were carried out with the aid of an acoustic measuring apparatus.

N75-31715/6GA PC$6.25/MF$2.25
Harvard Medical School, Boston, Mass.
Control Mechanisms of Circadian Rhythms in Body Composition: Implications for Manned Spaceflight.
Final Report.
M. C. M. Ede. 30 Jun 75, 173p NASA-CR-144413
Contract NAS9-14249

Descriptors: *Body composition (Biology), *Circadian rhythms, *Dynamic control, Corticosteroids, Electrolyte metabolism, Manned space flight.

For abstract, see STAR 1322

N75-31733/9GA PC$3.25/MF$2.25
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Abteilung Luftfahrtpsychologie.
The Visual-Motor-Orientation of the Diver in the Working Space Depending on Experience and Water Turbidity.
K. M. Goeters. 14 Apr 75, 22p DLR-FB-75-35
In German; English Summary.

Descriptors: *Sensorimotor performance, *Turbidity, *Underwater tests, *Visual tasks, *Water, Experience, Human tolerances, Visual discrimination, Visual observation.

For abstract, see STAR 1322

PB-245 399/1GA PC$7.50/MF$2.25
Franklin Inst. Research Labs., Philadelphia, Pa.
Thoracic Impact Injury Mechanism. Volume I.
Final rept. Jul 72-Dec 74,
M. M. Reddi, H. C. Tsai, F. W. Wendt, V. A. Rogers, and R. A. Erb. Aug 75, 234p F-C3417-Vol-1 DOT-HS-801 710
Contract DOT-HS-243-2-424
See also Volume 2, PB-245 429.

Descriptors: *Thorax, *Impact, *Injuries, *Biodynamics, Radiography, Mathematical models, Motion pictures, Experimental data, Monkeys, Bronchi, Respiratory system, Diaphragm(Anatomy), Esophagus, Lung, Mechanical properties, Stress(Physiology), Ribs(Bones), Blood vessels.
Identifiers: DOT/5A, *Biomechanics.

Mathematical modeling and related computer program development for the thorax under impact conditions are described. An experimental program for measuring thoracic behavior of Rhesus Monkeys under impact conditions by means of bi-planar cine-radiography is also described. Preparation of an anatomical cross-section atlas for Rhesus Monkey is discussed. Results of the computer program are compared to experimental data for a human thorax and are found to be satisfactory.

PB-245 429/6GA PC$8.75/MF$2.25
Franklin Inst. Research Labs., Philadelphia, Pa.
Thoracic Impact Injury Mechanism. Volume II.
Final rept. Jun 72-Dec 74,
M. M. Reddi, H. C. Tsai, F. W. Wendt, V. A. Rogers, and R. A. Erb. Aug 75, 288p F-C3417-Vol-2 DOT-HS-801 711
Contract DOT-HS-243-2-424
See also Volume 1, PB-245 399.

Descriptors: *Thorax, *Impact, *Injuries, *Biodynamics, Diaphragm(Anatomy), Musculoskeletal system, Bronchi, Trachea, Esophagus, Lung, Monkeys, Anthropometry, Anatomy, Stress(Physiology), Models, Pathology, Abstracts.
Identifiers: DOT/5A, *Biomechanics.

Contents:
General thoracic injuries;
Diaphragm injuries;
Skeletal system injuries;
Tracheobronchial injuries;
Esophageal injuries;
Lung injuries;
Cardiovascular injuries;
Thoracic impact experimental data;
Cadaver data validity;
Anthropometric dummies;
Material properties;
Protective equipment and injury;
Biodynamic modeling;
Rhesus monkey anatomy and physiology.

6T. Toxicology

AD-A016 882/3GA PC$3.25/MF$2.25
Armed Forces Radiobiology Research Inst Bethesda Md
Blocking Action of Snake Venom Neurotoxins at Receptor Sites to Putative Central Nervous System Transmitters.
Scientific rept.,
J. Parmentier, and D. O. Carpenter. Jun 75, 24p
Rept no. AFRRI-SR75-19

Descriptors: *Venoms, *Snakes, *Cholinergic blocking agents, Nervous system, Toxins and antitoxins, Cholinergic nerves, Epinephrine, Precursors, Central nervous system, Mollusca, Vertebrates, Nerve transmission, Probes.
Identifiers: Vipera russelli venom, Bungarus multicinctus venom, Crotalus durissus terrificus venom, Echis carinatus venom, Dopamine receptor sites, Snake venoms.

A general survey of crude venom from snakes of four different families revealed that several venoms which are known to operate at peripheral cholinergic junctions in vertebrates also interfere with cholinergic receptor sites in molluscan central nervous system tissue, and that venom from one snake, Vipera russelli, may contain a fraction which selectively interferes with dopamine receptor sites. Several additional experiments concerning the structure and mechanisms of both cholinergic and dopaminergic transmission are proposed and certain snake venoms are suggested for further investigation as possibly valuable pharmacological probes in future experiments of receptor pharmacology. (Author)

AD-A016 920/1GA PC$3.25/MF$2.25
Army Environmental Hygiene Agency Aberdeen Proving Ground Md
Hazard Evaluation of Candidate Face Net Impregnant ENT-20127, Pentyl Mandelate.
Final rept. May 73-Mar 75,
Maurice H. Weeks, Conrad R. Pope, and Joseph A. Macko, Jr. 23 Oct 75, 19p Rept no. USAEHA-51-090-73/76

Descriptors: *Insect repellents, *Toxicology, *Irritant compounds, Lethal dosage, Bioassay, Laboratory animals, Skin(Anatomy), Eye, Exposure(Physiology), Inhalation, Ingestion(Physiology).
Identifiers: *Mandelic acid/pentyl.

A hazard evaluation of the candidate face net impregnant technical grade pentyl mandelate (ENT 201127) was performed by means of laboratory animal studies using rats, rabbits, and guinea pigs. The technical grade compound did not produce primary irritation when applied to the intact or abraded skin of rabbits. No corneal injury, iritis or conjunctivitis was observed after a single application of the technical grade compound to the eyes of rabbits. Data indicate little acute toxic hazard from accidental ingestion. ENT-20127 did not produce skin sensitivization in guinea pigs. Acute aerosol as well as acute and subchronic saturated vapor inhalation exposures of rats resulted experimentally in no deleterious effect.

JPRS-65836 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington Va.
Combined Action on the Human Organism of a Mixture of the Major Components of Automobile Exhaust Gases (Carbon Monoxide, Nitrogen Dioxide, Formaldehyde and Hexane),
Yu. G. Feldman. 2 Oct 75, 12p
Trans. of Gigiena i Sanitariya (USSR) n10 p7-10 1974.

Descriptors: *Exhaust gases, *Toxicology, Air pollution, Automobiles, Carbon monoxide, Nitrogen dioxide, Formaldehyde, Hexanes, Thresholds(Perception), Toxic tolerances, Toxicity, Concentration(Composition), Pathophysiology, USSR, Translations.
Identifiers: *Air pollution effects(Humans), *Automobile exhaust.

The report contains a study of the effects on the human organism of a combination of a mixture of the major components of automobile exhaust gases and a formulation of hygienic standards for the concentration of such mixtures in the air.

PB-245 664/8GA Not available NTIS
Texas A and M Univ., College Station.
Survival and Chloride Ion Regulation of the Porcelain Crab 'Petrolisthes armatus' Exposed to Mercury,
G. Roesijadi, S. R. Petrocelli, J. W. Anderson, B. J. Presley, and R. Sims. 1974, 6p NSF/IDOE-75-44
Grants NSF-GX-37344, NSF/GX-37347
Pub. in Marine Biology v27 p213-217 1974.

Descriptors: *Toxicology, *Mercury poisoning, *Crabs, Ecology, Bioassay, Salinity, Exposure, Aquatic animals, Chlorides, Lethal dosage, Crustacea, Aquatic biology, Marine biology.
Identifiers: *Petrolisthes armatus.

Acute toxicity bioassays conducted at various salinities demonstrated that mercury (as mercuric chloride) at low concentrations was lethal to Petrolisthes armatus. Ninety-six hour LC50 values varied from 50 to 64 parts per billion (ppb) of mercury, depending on test salinities. Lower salinities decreased the time to death of mercury-exposed crabs. Differences in survival after 96 h due to salinity were not statistically significant. Blood chloride concentrations were regulated hyperchloride to the medium at low salinities and hypochloride at high salinities by acclimated crabs. The salinity isochloride to blood was 22 parts per thousand S. Transfer of crabs from 15 parts per thousand S to salinities ranging from 7 to 35 parts per thousand S resulted in new steady-state chloride levels within 12 h. Exposure to 50 ppb mercury did not alter chloride ion regulation of either acclimated crabs or crabs adjusting to new salinities.

7. CHEMISTRY

7A. Chemical Engineering

AD-A016 456/6GA PC$8.75/MF$2.25
Exxon Research and Engineering Co Linden N J Government Research Lab
Evaluation of Methods to Produce Aviation Turbine Fuels from Synthetic Crude Oils. Phase I.
Final rept. 24 Jun 74-24 Jan 75,
Henry Shaw, Charles D. Kalfadelis, and Charles E. Jahnig. Mar 75, 285p Rept no. GRU.1PEA.75
AFAPL-TR-75-10
Contract F33615-74-C-2036

Descriptors: *Aviation fuels, *Jet engine fuels, *Refining, Cost estimates, High density, Pyrolysis, Heat of combustion, Distillation, Cracking(Fracturing), Coal.
Identifiers: *Coal liquefaction, *Shale oil, *Synthetic fuels, Retort furnaces, Coal liquids, Process charting.

The feasibility of producing aviation turbine fuels from domestic coal and shale derived oils was assessed. Based on petroleum refining technology, the best methods currently available from making fuel products were evaluated for use in producing jet fuels from synthetics. It was concluded that shale oil is most likely to be used in jet fuel manufacturing. Coal liquids, on the other hand, will probably be used to make components for jet fuels and possibly also for new high density jet fuels. As a result of this analysis, it was recommended that shale oil hydroprocessing be emphasized in the experimental phase (Phase II) for producing specification aviation turbine fuels, along with the recommendation that hydroprocessing of coal oil should be studied as a source of jet fuel components and possibly as a new high density jet fuel.

AD-A016 888/0GA PC$3.75/MF$2.25
Picatinny Arsenal Dover N J
Conversion of Guanidine Nitrate to Nitroguanidine with Recycle of Spent Acid.
Technical interim rept.,
Maurice Warman, Stanley Semel, John Leccacorvi, Rocco Motto, and Richard Hutchinson. Oct 75, 42p Rept no. PA-TM-4871

Descriptors: *Guanidine nitrates, *Nitroguanidine, *Recycled materials, *Sulfuric acid, Synthesis(Chemistry), Tables(Data), Vacuum distillation, Bleed systems, Purity, Production rate, Batch processing, Salts, Ammonia.
Identifiers: Inorganic salts, Process charting.

Hercules Incorporated has designed a production facility to synthesize nitroguanidine and concentrate the spent acid for recycle. The program herein described was undertaken to verify the design criteria set forth by Hercules and to study parameters affecting the nitration and distillation of the spent acid. It was found that a 94-96% conversion of guanidine can be obtained using a sulfuric acid to sulfuric acid plus water ratio of 0.94. Vacuum distillation of the spent acid at 50mm Hg with a hold time of one hour at 100C resulted in good conversion of the dissolved guanidine moiety to guanidine sulfate without decomposition to ammonia. By minimizing the ammonium salts formed, only a 5-10% bleed stream of the recycled acid would be required.

PATENT-3 880 618 Not available NTIS
Department of the Interior, Washington, D.C.
Simultaneously Removing Sulfur and Nitrogen Oxides from Gases.
Patent,
Donald H. McCrea, and John G. Myers. Filed 2 Mar 73, patented 29 Apr 75, 5p PAT-APPL-337 342,
Also includes report no. DOCKET/MIN-1907.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Combustion products, *Adsorbents, *Air pollution control, *Nitrogen oxides, *Sulfur oxides, Aluminum oxides, Sodium aluminates.
Identifiers: PAT-CL-55-68, Alkalized alumina.

This invention relates to the removal of pollutants from waste gases. It was discovered that certain solids sorbents, at a temperature of about 75-150C, will simultaneously remove sulfur oxides and nitrogen oxides from a waste gas, but nitrogen oxides are removed only when sulfur oxides are present in the gas. It is therefore an object of the present invention to remove nitrogen oxides as well as sulfur oxides from waste gases.

PATENT-3 884 794 Not available NTIS
Department of the Interior, Washington, D.C.
Solvent Refined Coal Process Including Recycle of Coal Minerals.
Patent,
Willard C. Bull, Charles H. Wright, and Gerald R. Pastor. Filed 4 Mar 74, patented 20 May 75, 12p PAT-APPL-446 973,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Coal liquefication, Solvent extraction, Depolymerization, Hydrocarbons, Coal liquids, Distillation, Solids, Process charting.
Identifiers: PAT-CL-208-8, Solvent refined coal.

This invention relates to a liquid solvent dissolving process for producing reduced or low ash hydrocarbonaceous solid fuel and hydrocarbonaceous distillate liquid fuel from ash-containing raw coal. The purpose of the invention is to avoid thermal hydrocracking as much as possible and at least to the extent of avoiding excessive production of hydrocarbon gases since production of gases diminishes the yield of desired deashed solid fuel and liquid fuel products. This purpose is accomplished by performing the solvation process in two separate stages, each stage preferably employing a different temperature.

PB-245 279/5GA PC$6.25/MF$2.25
Bechtel Corp., San Francisco, Calif.
EPA Alkali Scrubbing Test Facility: Advanced Program.
Progress rept. no. 1, Oct 74-Apr 75,
Michael Epstein. Sep 75, 172p EPA/600/2-75-050
Contract EPA-68-02-1814
See also PB-244 901.

Descriptors: *Scrubbers, *Air pollution control equipment, *Sulfur dioxide, Electric power plants, Performance tests, Test facilities, Flue gases, Calcium oxides, Limestone, Desulfurization, Particles, Coal, Prototypes, Spray tanks, Washing, Boilers, Absorbers(Equipment), Particle size, Reliability, Combustion products, Chemical analysis.
Identifiers: *Limestone scrubbing, Alkaline scrubbing, Venturi separators, Spray tower scrubbers, Turbulent contact absorbers, Wet methods, Particulates.

The report gives results of advanced program tests on a prototype lime/limestone wet-scrubbing SO2 and particulate removal facility at TVA's Shawnee Power Station. With the objective of achieving reliable mist eliminator operation, a venturi/spray tower was operated with lime slurry, and a Turbulent Contact Absorber (TCA) with limestone. Each had 30,000 acfm (10MW equivalent) flue gas capacity. The venturi/spray tower system was maintained essentially clean in an 823-hour run at 8.0 ft/sec gas velocity and 8% slurry solids (the 3-pass, open-vane chevron mist eliminator was intermittently washed on both topside and underside with makeup water). The TCA system was operated successfully in an 1835-hour run at 8.6 ft/sec gas velocity and 15% slurry solids (the mist elimination system consisted of a Koch Flexitray in series with a 6-pass, closed-vane chevron mist eliminator, both with underside wash). Both scrubber systems operated with better than 99% particulate removal efficiency and with outlet grain loadings of 0.01 to 0.03 grains/scf. A correlating equation is presented for TCA pressure drop tests.

PB-245 629/1GA PC$8.50/MF$2.25
Air Products and Chemicals, Inc., Marcus Hook, Pa. Houdry Div.
Survey Reports on Atmospheric Emissions from the Petrochemical Industry. Volume III.
Final rept.,
J. W. Pervier, R. C. Barley, D. E. Field, B. M. Friedman, and R. B. Morris. Apr 74, 261p*
EPA/450/3-73/005c
Contract EPA-68-02-0255
See also Volume 2, PB-244 958, and Volume 4, PB-245 630.

Descriptors: *Air pollution control, *Chemical industry, Maleic anhydride, Nylon 6, Nylon 66, Phenol, Polyethylene, Aldehydes, Alcohols, Manufacturing, Air pollution control equipment, Inventories, Carbon monoxide, Hydrocarbons, Nitrogen dioxide, Sulfur dioxide, Surveys, Particles, Process charting.
Identifiers: *Petrochemical industry, Particulates.

This document is one of a series of four volumes prepared for the Environmental Protection Agency (EPA) to assist it in determining the significance of air pollution from the petrochemical industry. A total of 33 distinctly different processes which are used to produce 27 petrochemicals have been surveyed. This volume covers the following processes: Maleic Anhydride, Nylon 6, Nylon 66, Oxo Processes, Phenol, High-Density Polyethylene, and Low-Density Polyethylene. For each process the report includes a process description, a process emission inventory, a catalog of emission control equipment, a list of producers, and an evaluation of the significance of the air pollution from the process. Also included is a summary table of emissions to the atmosphere from all the processes studied.

PB-245 630/9GA PC$8.75/MF$2.25
Air Products and Chemicals, Inc., Marcus Hook, Pa. Houdry Div.
Survey Reports on Atmospheric Emissions from the Petrochemical Industry. Volume IV.
Final rept.,
J. W. Pervier, R. C. Barley, D. E. Field, B. M. Friedman, and R. B. Morris. Apr 74, 287p*
EPA/450/3-73/005d
Contract EPA-68-02-0255
See also Volume 3, PB-245 629.

Descriptors: *Air pollution control, *Chemical industry, Polypropylene, Polystyrene, Polyvinyl chloride, Styrene, Butadiene polymers, Elastomers, Vinyl acetate, Vinyl chloride, Manufacturing, Air pollution control equipment, Inventories, Surveys, Process charting, Carbon monoxide, Hydrocarbons, Nitrogen dioxide, Sulfur dioxide, Particles.
Identifiers: *Petrochemical industry, Particulates.

This document is one of a series of four volumes prepared for the Environmental Protection Agency (EPA) to assist it in determining the significance of air pollution from the petrochemical industry. A total of 33 distinctly different processes which are used to produce 27 petrochemicals have been surveyed. This volume covers the following processes: Polypropylene, Polystyrene, Polyvinyl Chloride, Styrene, Styrene-Butadiene Rubber, Vinyl Acetate via Acetylene, Vinyl Acetate via Ethylene, and Vinyl Chloride. For each process the report includes a process description, a process emission inventory, a catalog of emission control equipment, a list of producers, and an evaluation of the significance of the air pollution from the process. Also included is a summary table of emissions to the atmosphere from all the processes studied.

7B. Inorganic Chemistry

AD-A016 863/3GA PC$3.25/MF$2.25
Picatinny Arsenal Dover N J

Wabash - RDX Manufacture: A Laboratory Examination of the Ammonium Nitrate Process.
Technical memo.,
Maurice Warman. Oct 75, 13p Rept no. PA-TM-2171

Descriptors: *RDX, *Ammonium nitrate, *Nitric acid, Nuclear magnetic resonance, Vacuum distillation, Manufacturing.
Identifiers: *Wabash process, Cyclotrimethylenetrinitramine, Nitrolysis.

The optimized 'AN' (ammonium nitrate) process for preparing RDX, developed some years ago at Wabash River Ordnance Works on a laboratory level, has been checked and verified. Items considered included yield and quality of RDX, recovery and recycle of excess ammonium nitrate, recovery of excess nitric acid, and its stabilization by controlled fume-off. The process is considered ready for study on a large scale.

AD-B003 843/0GA PC$5.25/MF$2.25
Hercules, Inc., Cumberland, Md. Allegany Ballistics Lab.
Fluorine Generator.
Final rept. 2 Feb-30 Jun 74,
R. B. Leining, T. D. Sauer, H. L. Young, and E. D. Casseday. Apr 75, 109p A0263-115-01-028 RK-CR-75-27
Contract DAAH01-73-C-1074
Distribution limitation now removed.

Descriptors: *Fluorine, *Gas generating systems, *Chemical lasers, Laser materials, Deuterium compounds, Fluorides, Solids, Salts, Fluorinated hydrocarbons, Hydrogen fluoride, Binders, Arsenic compounds, Hydrazine derivatives, Solid fuels, Boron, Thermochemistry, Compatibility, Combustion, Mechanical properties, Sensitivity, Stability, Nozzles, Cooling, Impact, Friction, Heat transfer, Propellant grains.
Identifiers: Hydrogen fluoride lasers.

The energetic salts NF4AsF6 and N2F4.AsF5 were used in the preparation of fluorine generator grains. Based on thermochemical calculations, blends of these salts with a fuel and fluorocarbon binder were formulated and pressed into solid grains. Stability, compatibility, and sensitivity data were gathered. Solid grains were successfully combusted. Mechanical properties were demonstrated from inert specimen data. Precombustor concepts and insulation materials were evaluated for application to HF/DF laser systems.

COM-75-11383/7GA PC$3.25
Rhode Island Univ., Kingston. Graduate School of Oceanography.
Chemical Studies on the Dissolved Organic Matter in Seawater. Isolation and Fractionation,
Richard A. Kerr, and James G. Quinn. 1975, 14p
Marine Reprint-39 NOAA-75091901
Grant NOAA-04-3-158-3
Pub. in Deep-Sea Research, v22 p107-116 1975.

Descriptors: *Dissolved organic matter, *Sea water, Carbonation dissolving, Oceans, Distillation, Gas chromatography, Mass Spectroscopy, Isolation, Thin layer chromatography, Carbon compounds.
Identifiers: Sea Grant program, Reprints.

The isolation and fractionation of dissolved organic matter from seawater using charcoal and alumina chromatography are described. Spectroscopic studies demonstrate distinct differences among organic matter from the open ocean, estuarine waters, and sediments. Adsorption of dissolved organic carbon on charcoal ranged from 55 to 86%, while 39-99% of this adsorbed organic carbon was removed by the base and methanol extractions. The results showed that initial adsorption on charcoal is simple, low cost, and readily adaptable to handling large volumes. The most productive approach to the problem of the characterization of dissolved organic matter in seawater is the procedure that involves formation of derivatives, extraction, separation on an alumina column and by thin-layer chromatography, and analysis by gas-liquid chromatography and mass spectrometry.

PAT-APPL-510 188/GA PC$3.25/MF$2.25
Environmental Protection Agency, Washington, D.C.
Polarization Excitation Device for X-Ray Fluorescence Analysis.
Patent Application,
Thomas G. Dzubay. Filed 30 Sep 74, 14p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, *X ray fluorescence, *Spectrochemical analysis, *Trace elements, X ray analysis, Fluorescence.

The patent application is a device for improving the sensitivity for elemental analysis by X-ray fluorescence using energy dispersive detectors. Samples are analyzed for their trace elemental composition by irradiating the samples with a beam of nearly monochromatic and polarized photons and detecting the fluorescent photons with an energy dispersive solid-state detector. The polarized photon source consists of an X-ray tube which emits characteristic X-rays and whose output is scattered at a right angle by a polarizing disc.

PAT-APPL-595 902/GA PC$3.25/MF$2.25
Department of the Interior, Washington, D.C.
Dehydration of Magnesium Chloride.
Patent Application,
Henry Dolezal. Filed 14 Jul 75, 8p
DOCKET/MIN-2369
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Magnesium chlorides, *Dehydration, *Patent applications, Hydrates, Brines, Amine salts, Magnesium.
Identifiers: Amine hydrochloride.

The patent application discloses a method for dehydrating magnesium chloride hydrates or brines by complexing with amine hydrochlorides. Magnesium chloride hydrate or brine is reacted to an amine hydrochloride to form a complex which is then heated to first drive off water and then at a more elevated temperature to decompose the anhydrous complex into anhydrous magnesium chloride and amine hydrochloride. Any magnesium oxides present in the starting material is converted to the chloride by reaction with the HCl present.

7C. Organic Chemistry

AD-A016 475/6GA PC$3.25/MF$2.25
Air Force Materials Lab Wright-Patterson AFB Ohio
Synthesis of Oxyarylene BBB Polymers.
Final rept. Mar-Dec 73,
Fred E. Arnold. Jun 75, 24p Rept no. AFML-TR-74-279

Descriptors: *Benzimidazoles, *Heat resistant plastics, Solubility, Thermal analysis, Solutions(Mixtures), Heat transfer, Thermogravimetric analysis.
Identifiers: BBB polymers, Polybenzimidazoles, *Poly(bisbenzimidazo(2-1-b/1'-2'-j)Benzophenanthroline-3-12-diyl/6-9-dihydro-6-9-dioxo), *Oxarylene, Thermal measurements, Fusibility.

This work was performed to determine the extent to which processability parameters such as solubility and fusibility could synthetically be altered in the benzimidazobenzophenanthroline (BBB) polymer system. The BBB polymer has excellent thermal and thermal oxidative properties; however, the polymer is infusible and is only soluble in highly corrosive solvents. A series of BBB polymers had been synthesized. The resulting BBB type polymers with an increased number of rotational sites along the polymer backbone were soluble in m-cresol and exhibited glass transition temperatures in the 300-350C range. All of the polymers displayed good thermal and thermal oxidative stabilities characteristics of this class of materials.

AD-A016 515/9GA PC$3.25/MF$2.25
Utah State Univ Logan
Preparation of Allyldibromophosphine and Allyltrifluorophosphorane,
E. R. Falardeau, J. G. Morse, and K. W. Morse.
14 Oct 74, 5p ARO-12335.5-C
Grant DAHC04-74-G-0209
Availability: Pub. in Inorganic Chemistry, v14 n6 p1239-1241 1975.

Descriptors: *Organic phosphorus compounds, *Propenes, *Fluorine compounds, *Bromine compounds, *Phosphine, Synthesis(Chemistry), Chemical reactions, Mass spectroscopy, Infrared spectroscopy, Nuclear magnetic resonance, Hydrogen compounds, Bromides, Reprints.

The reaction of allyldifluorophosphine with HBr has been studied. The products characterized by mass, ir, and NMR spectroscopy and by analysis--allyltrifluorophosphorane, F3PHCH2CHCH2, and allyldibromophosphine, Br2PCH2CHCH2--are consistent with initial addition of HBr to trivalent phosphorus followed by disproportionation through successive loss of HF and addition of more HBr. (Author)

AD-A016 560/5GA PC$3.25/MF$2.25
Rochester Univ N Y Dept of Physics and Astronomy
Inhomogeneous Broadening and Excited-Vibrational-State Lifetimes in Low-Temperature Organic Mixed Crystals,
A. P. Marchetti, W. C. McColgin, and J. H. Eberly. 26 Mar 75, 5p ARO-8915.17-P
Contract DAHC04-75-C-0084
Availability: Pub. in Physical Review Letters, v35 n6 p387-390, 11 Aug 75.

Descriptors: *Organic compounds, Excitation, Molecular vibration, Molecules, Crystals, Fluorescence, Bandwidth, Mixtures, Low temperature, Reprints.
Identifiers: Mixed crystals.

We have determined the extent of residual inhomogeneous broadening in the 'sharp' mixed-crystal spectrum of the large organic molecule pentacene; and we report a technique for the direct fluorescence measurement of excited-vibrational-state bandwidths. We have found the lifetime of the 267/cm vibronic band in pentacene to be greater than 0.2 nsec. (Author)

AD-A016 977/1GA PC$3.25/MF$2.25
Stanford Research Inst Menlo Park Calif
Oxidation of Sulfur and Amine Model Compounds.
Quarterly progress rept. Mar-Jul 75,
T. Mill, and C. W. Gould. Aug 75, 16p Rept no. SRI-PYU-3280-4 EC-CR-76017
Contract DAAA15-74-C-0150
See also AD-A008 441.

Descriptors: *Sulfur compounds, *Amines, *Oxidation, Conversion, Reaction kinetics, Photosensitivity, Sensitizing, Photochemical reactions, Sulfoxides, Decontamination, Chemical warfare agents.
Identifiers: Acid dyes, Rose bengal, Sulfide/dibutyl, Photosensitizers, Bleaching, Triethylamine/1-1'-dimethyl, Reaction rates, Sulfur monoxide.

Very high rates of conversion of Bu2S to Bu2SO are possible (75% conversion in 15 minutes) using sunlight and photosensitizers in solution to give, almost quantitatively, Bu2SO. Somewhat lower rates are obtained using polymer-bound RB but the available evidence points to a longer useful lifetime for P-RB than for RB in solution owing to a much lower rate of bleaching. The intrinsic rate of photooxidation of iPr2NEt by RB and O2 appears to be about one-hundredth as fast as for Bu2S and to proceed by another mechanism. Experiments at 0.78M are in agreement with published data for oxidation of 0.02M Bu3N.

COM-75-50581/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Rate Constants for the Reactions of Ozone with Ethene and Propene, from 235.0 to 362.0 K.
Final rept.,
J. T. Herron, and R. E. Huie. 1974, 4p
Sponsored in part by Department of Transportation, Washington, D.C.
Pub. in Jnl. of Physical Chemistry, v78 p21 p2085-2088 1974.

Descriptors: *Ozone, *Ethylene, *Propylene, Reaction kinetics, Mass spectroscopy, Air pollution.
Identifiers: Reprints, Reaction rates, DOT/5N.

The rate constants for the reactions of ozone with ethene and propylene have been measured over the temperature range 235.0 to 362.0 K, using a stopped-flow system coupled to a beam sampling mass spectrometer. The research was conducted to better understand air pollution chemistry.

COM-75-50583/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Preliminary Communication - Nitrogen-15 n.m.r. Spectroscopy of Amino Sugars.
Final rept.,
B. Coxon. 1974, 3p
Pub. in Carbohydrate Research, v35 pC1-C3 1974.

Descriptors: *Galactose, *Carbohydrates, *Glucose, Synthesis(Chemistry), Hexoses, Sugars, Labeled substances, Isotopic labeling, Nitrogen isotopes, Nuclear magnetic resonance.
Identifiers: Reprints, Nuclear magnetic resonance(Nitrogen 15).

Derivatives of 6-amino-6-deoxy-D-galactose-6-(15)N and -D-glucose-6(15)N and the corresponding unlabeled compounds have been synthesized via reactions of appropriate 6-O-tolyl-p-sulfonyl or 6-deoxy-6-iodo derivatives with potassium phthalimide-15N (or 14N), followed by hydrazinolysis of the phthaloyl group. 15N n.m.r. spectra of the amino sugar derivatives have been measured directly at 9 MHz by pulse-Fourier transform techniques. The recording of spectra of 15N in natural abundance in the amino sugar derivatives was aided by proton irradiation which caused a substantial negative, nuclear Overhauser effect (NOE), even for derivatives in which the 15N nucleus is not directly bonded to a proton.

COM-75-50587/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Reactions of Atomic Oxygen (O triplet P) with Organic Compounds.
Final rept.,
Robert E. Huie, and John T. Herron. 1975, 80p
Pub. in Progress in Reaction Kinetics, v8 n1 pt1 p1-80 1975.

Descriptors: *Oxygen, Chemical reactions, Atoms, Reaction kinetics.
Identifiers: Oxygen atoms, Chemical reaction mechanisms.

The reactions of atomic oxygen (O triplet P), in the gas phase, with organic compounds are reviewed. The various techniques used in these studies are discussed critically. The kinetics and mechanisms of the reactions of atomic oxygen with organic compounds are discussed in detail.

COM-75-50615/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Symmetrical Phenylosotriazoles from Inositols.
Final rept.,
Alexander J. Fatiadi. 1974, 8p
Pub. in Carbohydrate Research Note, v35 p280-287 1974.

Descriptors: *Triazoles, *Molecular structure, Synthesis(Chemistry), Nitrogen heterocyclic compounds.
Identifiers: Reprints, *Inositols, Cyclohexane hexols, Triazole/phenyl, Molecular conformations.

The application of mercuric acetate reagent to conversion of inosose phenylosazones into phenylosotriazoles in 40--47% yield is described. Analysis of p.m.r. spectra of inositol phenylosotriazole esters (e.g., acetates, propionates, benzoates) and of their parent compounds on 'decoupling' of their hydroxyl groups (by protonation, or deuterium exchange) showed a symmetrical pattern (presence of a simple, two-fold axis of symmetry in an AA'BB' system); a half-chair conformation of these phenylosotriazole esters in solution was deduced from the p.m.r. spectra. Free inositol phenylosotriazoles in solution exist exclusively in a half-chair conformation.

COM-75-50629/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Conformational Analysis of Acylated 1,1-Bis(Acylamido)-1-Deoxypentitols by Fourier-Transform, P. M. R. Spectroscopy.
Final rept.,
Bruce Coxon, R. Stuart Tipson, Maria Alexander, and Jorge O. Deferrari. 1974, 17p
Pub. in Carbohydrate Research, v35 p15-31 1974.

Descriptors: *Molecular structure, *Carbohydrates, Nuclear magnetic resonance, Nomenclature, Sensitivity, Fourier analysis, Paramagnetic resonance.
Identifiers: *Pentitol/bis(acylamido)-deoxy, Molecular conformations, Reprints.

The conformations of eight acylated 1,1-bis(acylamido)-1-deoxypentitols in solution have been studied by pulse, Fourier-transform, p.m.r. spectroscopy at 90 MHz. The arabino and lyxo derivatives adopt the zigzag conformation, whereas the ribo and xylo derivatives favor different sickle conformations. A system of nomenclature for the conformations of acyclic carbohydrate derivatives, and the validity of the conformational assignments of these derivatives by the p.m.r. method, are discussed. The relative merits and accuracy of the continuous-wave and pulse-Fourier p.m.r. spectroscopic methods in the conformational analysis of carbohydrates are appraised, and the applicability of the exponential-filtering technique to enhancement of either the sensitivity or the resolution of their spectra is demonstrated.

ESDU-75015 PC$146.50
Engineering Sciences Data Unit Ltd., London (England).
Heat Capacity and Enthalpy of Liquids. I: Aromatic Hydrocarbons.
Data item.
Aug 75, 15p*
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, Va. 22161.

Descriptors: *Heat capacity, *Enthalpy, *Aromatic hydrocarbons, Liquid saturation, Aromatic monocyclic hydrocarbons, Polyphenyl hydrocarbons, Naphtalene, Melting points, Boiling points, Thermodynamic properties, Critical point, Tables(Data), Benzene, Aromatic hydrocarbons, Polycyclic compounds, Great Britain.
Identifiers: ESDU/RC.

The Data Item presents values of saturated liquid heat capacity and enthalpy for the aromatic hydrocarbons which are members of the following groups: C6 to C12 alkylbenzenes; C8 alkenylbenzene; C12 to C18 polyphenyl hydrocarbons; C10 to C14 fused ring hydrocarbons. The data on which these values are based are the most reliable available and the range covered is from the melting point to the normal boiling point or to the limit of the experimental data whichever is the higher. One section describes the procedure used to obtain the values of heat capacity presented and indicates the effect of pressure. Values of enthalpy have been derived from values of heat capacity.

PAT-APPL-596 883/GA PC$3.25/MF$2.25
Department of the Interior, Washington, D.C.
Method for Making Asymmetric Semipermeable Membranes.
Patent Application,
Charles R. Mungle, and Ronald L. Fox. Filed 17 Jul 75, 14p DOCKET/SAL-2304
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Casting, *Patent applications, *Cellulose triacetate, Desalting, Alcohol, Polycarboxylic acids, Osmosis, Semipermeability.
Identifiers: Asymmetric membranes, Reverse osmosis.

Asymmetric cellulose diacetate semipermeable membranes suitable for use in reverse osmosis process for producing potable water from brackish or saline water have been known for sometime. Such asymmetric membranes have a thin, dense permselective surface layer supported by a much thicker porous layer of the same polymeric material. These membranes are somewhat limited in achieving very high rejection capability and are also vulnerable to hydrolysis. It has been found, according to the patent application, that it is possible to select a suitable solvent system and use it to prepare asymmetric membranes from cellulose triacetate which has a superior rejection capability. The casting solution should also contain an organic swelling agent. Gelling is accomplished by immersion in water to remove the remaining solvents and swelling agents, and annealing is not necessary to achieve the high-rejection capability.

PATENT-3 824 289 Not available NTIS
Department of the Navy Washington D C
Method for the Manufacture of Tetrakis (Dimethylamino) Ethylene.
Patent,
Thomas Liggett. Filed 21 Oct 71, patented 16 Jul 74, 4p Rept nos. PAT-APPL-191 560,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Chemiluminescence, Synthesis(Chemistry), Amines, Alkenes, Fluorinated hydrocarbons, Chlorinated hydrocarbons.
Identifiers: PAT-CL-260-583-P, *Ethene tetramine/octamethyl, Ethene/chloro-trifluoro, Dimethylamine.

Tetrakis (Dimethylamino) ethylene (TMAE) is a clear, light yellow, liquid, chemiluminescent material of interest to the military services for a variety of operations, as well as being useful as a polymerization initiator, e.g. for vinyl polymerizations. It is useful as an emergency source of light such as is needed when an airplane is disabled. The patent describes an improved method for the manufacture of tetrakis (dimethylamino) ethylene (TMAE), which comprises the step of reacting chlorotrifluoroethylene (CTFE) with dimethylamine (DMA). The invention also contemplates a new and useful method for separating and recovering excess DMA.

PATENT-3 877 978 Not available NTIS
Department of the Interior, Washington, D.C.
Semipermeable Membranes.
Patent,
Seymour S. Kremen, Gerald E. Foreman, and John M. Chirrick. Filed 27 Mar 74, patented 15 Apr 75, 8p PAT-APPL-455 461,
Also includes report no. DOCKET/SAL-2276.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Casting, *Patents, *Membranes, Osmosis, Vinyl acetate, Vinyl copolymers, Desalting, Carboxylic acids, Semipermeability.
Identifiers: PAT-CL-210-23, *Reverse osmosis.

This invention relates to semipermeable membranes for use in reverse osmosis and more particularly to methods of improving the rejection performance of such semipermeable membranes. Regardless of the materials from which semipermeable membranes are made, it has been found that, after membranes have been used for substantial periods of time, they begin to show a decrease in their rejection performance. Therefore the major objective of this invention is to provide improvements in the salt rejection performance of semipermeable membranes. So it was found that by contacting a semipermeable membrane with an effective amount of a supplemental polymer containing a substantial amount of acetyl groups and effecting its attachment to the membrane, the rejection performance of the membrane can be markedly increased without a proportional decrease in the rate of flow or flux therethrough.

PATENT-3 878 276 Not available NTIS
Department of the Interior, Washington, D.C.
Cellulose Acetate Blend Membranes.
Patent,
Donald L. Hoernschemeyer. Filed 24 May 72, patented 15 Apr 75, 5p PAT-APPL-256 501,
Also includes report no. DOCKET/SAL-1850.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Casting, *Patents, *Membranes, *Cellulous acetate, Osmosis, Ethyl ether, Desalting, Cellulouse esters, Solvents, Alcohols.
Identifiers: PAT-CL-264-41, *Reverse osmosis.

This invention concerns the preparation of improved semipermeable membranes for separatory processes using reverse osmosis. The improved blend membranes can be prepared from a solution consisting of cellulose acetate of the proper acetyl content, a solvent, and a compound which belongs to the class of ether-alcohols, specifically alkyl half-ethers of ethylene glycol or diethylene glycol. This latter compound replaces the non-solvent and the swelling agent employed in the casting formulations of the prior art.

7D. Physical Chemistry

AD-A016 289/1GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Cambridge Dept of Materials Science and Engineering
Molecular-Orbital Studies of Transition- and Noble-Metal Clusters by the SCF-X(alpha) Scattered-Wave Method.
Interim technical rept.,
K. H. Johnson, J. B. Diamond, C. Y. Yang, R. P. Messmer, and S. K. Knudson. 15 Oct 75, 74p
Rept no. TR-1
Contract N00014-75-C-0970
Prepared in cooperation with General Electric Corporate Research and Development, Schenectady, N.Y., Contract F44620-72-C-0008. Sponsored in part by National Science Foundation, Washington, D.C.

Descriptors: *Molecular structure, *Quantum chemistry, *Molecular orbitals, *Chemisorption, *Band theory of solids, Precious metals, Transition metals, Copper, Nickel, Palladium, Platinum, Catalysts, Surface chemistry, Tables(Data).
Identifiers: *Clusters(Atoms), Huckel molecular orbitals, CNDO wave functions.

The electronic structures of small copper, nickel, palladium, and platinum clusters having simple-cubic and cubo-octahedral geometries have been calculated, using the self-consistent-field X-alpha scattered-wave approach to molecular-orbital (MO) theory. As the cluster size and coordination number are increased, the MO results show increasing similarity to the electronic structures of the corresponding crystalline metals. The calculated ionization potentials decrease gradually with increasing cluster size and for the 13-atom cubo-octahedral clusters are approximately 2 eV greater than the corresponding average bulk work functions. Localized d-electron states are also observed for the cubo-octahedral transition-metal clusters. They appear to be cluster analogs of the 'surface states' postulated for crystalline transition metals and probably play an important role in the chemisorption and catalytic activities of small metal aggregates of the type utilized as the active centers of heterogeneous catalysts. The SCF-Xalpha-SW MO results for transition-metal clusters are critically compared with those obtained for similar clusters by the extended-Huckel (EH) and complete-neglect-of-differential-overlap (CNDO) methods. The implications of these results in surface-cluster studies of chemisorption on transition metals are discussed.

AD-A016 314/7GA PC$3.25/MF$2.25
Joint Inst for Lab Astrophysics Boulder Colo
Continuum Spectra and Potentials of Li-Noble Gas Molecules,
R. Scheps, Ch. Ottinger, G. York, and A. Gallagher. 15 Apr 75, 10p
Contract N00014-67-A-0405-0008
Availability: Pub. in Jnl. of Chemical Physics, v63 n6 p2581-2590, 15 Sep 75.

Descriptors: *Lithium, *Rare gases, *Emission spectra, *Fluorescence, Argon, Krypton, Xenon, Helium, Neon, Reprints.

The normalized emission spectrum of the Li(2p-2s) resonance transition has been measured in the presence of 10-1000 Torr of noble gas. Fluorescence at 100-3000 A from the atomic line, due to the A-X and B-X bands of Li-noble gas molecules, has been measured as a continuum with 1.5 nm resolution. The lithium is optically excited in a 670 K cell. The lithium is optically thin (approx. .000001 Torr) so that the continuum emission per excited lithium atom is obtained from the normalized emission. The attractive A-state potentials for Li-Ar, Kr, and Xe have been constructed by analysis of the A-X band spectra in the limit of high and low noble-gas densities. At high densities each spectrum is due to an equilibrated vibrational distribution of A-state molecules, whereas at low densities only free collision states contribute. The ratio of the two spectra thus depends on the excited state potential and has been used to determine this potential where it is attractive. Absorption and stimulated emission coefficients for Li-noble gas vapors are also deduced from the data. (Author)

AD-A016 316/2GA PC$3.25/MF$2.25
Queen'S Univ Belfast (Northern Ireland) Dept of Applied Mathematics and Theoretical Physics
First Derivative of the Continuous Generalized Oscillar Strength of Helium When the Change in the Momentum of the Incident Particle is Zero,
K. L. Bell, and A. E. Kingston. 22 May 75, 5p
Contract N00014-69-C-0035
Availability: Pub. in Jnl. of Physics B: Atomic and Molecular Physics, v8 n12 pL265-L267 1975.

Descriptors: *Atomic spectroscopy, *Atomic energy levels, *Electron scattering, Helium, Momentum transfer, Dipoles, Ionization, Wave equations, Reprints.
Identifiers: *Oscillator strengths, *F values.

The first derivative of the continuous generalized oscillator strength of helium has been calculated when the change in the momentum of the incident is zero. Quite good agreement is obtained with experiments.

AD-A016 435/0GA PC$3.75/MF$2.25
Ohio State Univ Columbus Electroscience Lab
Spectrophone Measurement of the Water Vapor Continuum at DF Laser Frequencies.
Interim rept. 1 Oct-30 Dec 74,
E. K. Damon, J. C. Peterson, F. S. Mills, and R. K. Long. Aug 75, 38p Rept no. ESL-4045-1
RADC-TR-75-203
Contract F30602-75-C-0029, ARPA Order-1279

Descriptors: *Laser beams, *Methane, *Nitrogen oxides, *Water vapor, Absorption spectra, Absorption coefficients, Light transmission, Tables(Data).
Identifiers: Deuterium fluoride lasers, *Spectrophones, Atmospheric attenuation.

A laser-illuminated spectrophone is used to measure the absorption of water vapor at six DF laser lines of interest. These measurements are related to the absorption coefficients of CH4, N2O, HDO, and the known line structure of H2O to infer the extinction coefficient arising from the water vapor continuum in the region 2550-2750/cm.

AD-A016 460/8GA PC$5.25/MF$2.25
Baird-Atomic Inc Bedford Mass
Optimization and Evaluation of a Fluorescence Oil Spill Detector. Volume 1. Laboratory Measurements and Field Evaluation.
Final rept. Dec 74-May 75,
William A. Webb, and Herman G. Eldering. May 75, 108p Rept no. 5/75-6233-Vol-1 USCG-D-108-75
Contract DOT-CG-43845-A
See also Volume 2, AD-A016 464.

Descriptors: *Oil spills, *Oil pollution, *Fluorescence, Aromatic hydrocarbons, Fuel oil, Lubricating oils, Automotive fuels, Visible spectra, Measurement, Algorithms.
Identifiers: *Spectroscopic analysis, *Oil pollution detection, Fluorometers, Performance evaluation, Crude oil.

The work described in this report was directed at maximizing the detection range of an automatic fluorescence oil spill detector and evaluating the detection capabilities of this detector against a wide range of petroleum oils.

On the basis of this evaluation, a Scanning Oil Spill detector was designed. Corrected fluorescence spectra of 22 petroleum oils at several film thicknesses are presented, and fluorescence spectral distribution and intensity of these oils are compared. A detection algorithm which discriminates oil from marine fluorescence on the basis of fluorescence measurements in two spectral regions is described. Laboratory and field tests demonstrated that oil fluorescence may be automatically and consistently discriminated from marine fluorescence.

AD-A016 464/0GA PC$3.75/MF$2.25
Baird-Atomic Inc Bedford Mass
Optimization and Evaluation of a Fluorescence Oil Spill Detector. Volume 2. Prototype Design.
Final rept. Dec 74-May 75,
Herman G. Eldering, and William A. Webb. May 75, 30p Rept no. 5/75-62633-Vol-2 USCG-D-109-75
Contract DOT-CG-43845-A
See also Volume 1, AD-A016 460.

Descriptors: *Oil pollution, *Oil spills, *Ultraviolet detectors, Scanning, Cost effectiveness, Monitoring, Fluorescence, Detectors, Optics.
Identifiers: *Multispectral Active Passive Scanner, Design criteria, *Oil pollution detection, Remote sensing, Electronic control circuitry, Performance evaluation.

This report reviews the operational and technical requirements of a low cost harbor surveillance unit and describes the design of a Scanning Oil Spill Detector. Operational considerations such as coverage resulted in a design containing both azimuth and elevation scanning. The incremental cost of scanning is less than the cost of additional units needed to provide the additional coverage.

AD-A016 471/5GA PC$4.25/MF$2.25
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
Catalysts for a Cesium Bicarbonate Membrane Carbon Dioxide Scrubber.
Final rept. 1 Jul 73-30 Jun 74,
John P. Allen. Jun 75, 67p Rept no. AFFDL-TR-74-154

Descriptors: *Carbon dioxide, *Membranes, Catalysis, Effectiveness, Tables(Data), Gas filters, Solubility, Absorption, Desorption, Permeability.
Identifiers: Oxygen supply equipment, Cesium carbonates.

Application studies of an alkaline membrane CO2 scrubber for future military self-contained aviators' oxygen systems indicated that a considerable improvement in CO2 scrubbing capacity would be needed. Alkaline membrane CO2 scrubbers had exhibited rather low operational effectiveness for CO2 control in closed-loop aviators' oxygen systems. Accordingly, catalytic alkaline materials were evaluated to determine whether CO2 permeation rates could be increased through the membranes. The materials evaluated were potassium tellurite, sodium selenite, sodium arsenite, sodium borate and 'Catacarb', a proprietary material used in acid gas scrubbing process in refineries. A special CO2 permeation apparatus was used to obtain data on permeation rates. Resulting data indicated that catalysis of varying degree occurred with some of the materials, particularly potassium tellurite. While no further efforts are planned on CO2 scrubbers for aircraft, the data is useful for future closed environment systems.

AD-A016 512/6GA PC$3.25/MF$2.25
Stanford Univ Calif Microwave Lab
Properties of Intercalated 2H-NbSe2, 4Hb-TaS2, and 1T-TaS2,
S. F. Meyer, R. E. Howard, G. R. Stewart, J. V.Acrivos, and T. H. Geballe. 16 Apr 74, 12p
Rept no. ML-2415 AFOSR-TR-75-1459
Grant AF-AFOSR-2435-73
Availability: Pub. in Jnl. of Chemical Physics, v62 n11 p4411-4419, 1 Jun 75.

Descriptors: *Metal complexes, *Transition metals, *Chalcogens, Organic compounds, Single crystals, Layers, Niobium compounds, Selenides, Tantalum compounds, Sulfides, Physical properties, Superconductivity, Transport properties, Reprints.

The layered compounds 2H-NbSe2, 4Hb-TaS2, and 1T-TaS2 have been intercalated with organic molecules; and the resulting crystal structure, heat capacity, conductivity, and superconductivity have been studied. The coordination in the disulfide layers was found to be unchanged in the product phase. Resistance minima appear and the superconducting transition temperature is reduced in the NbSe2 complex. Conversely, superconductivity is induced in the 4Hb-TaS2 complex. Corresponding evidence of a large change of the density of states, negative for 2H-NbSe2 and positive for 4Hb-TaS2, was also observed upon intercalation. The transport properties of all the intercalation complexes show a pronounced dependence upon the coordination of the transition metal. (Author)

AD-A016 514/2GA PC$3.25/MF$2.25
Duke Univ Durham N C
Millimeter- and Submillimeter-Wave Spectrum and Molecular Constants of Cuprous Iodide,
E. Lowry Manson, Frank C. De Lucia, and Walter Gordy. 10 Mar 75, 5p ARO-11803-10-P
Grant DAHC04-74-G-34
Availability: Pub. in Jnl. of Chemical Physics, v62 n12 p4796-4798, 15 Jun 75.

Descriptors: *Molecular spectroscopy, *Diatomic molecules, *Microwave spectroscopy, Monomers, Millimeter waves, Submillimeter waves, Copper compounds, Iodides, Hyperfine structure, Quadrupole moment, Reprints.
Identifiers: Cuprous iodide, Absorption cells, Rotational transitions.

Monomeric cuprous iodide (CuI) in the vapor state has been produced as an intermediate product of the reaction of copper with iodine vapor at 1100 K in a quasi-free-space microwave absorption cell.

AD-A016 606/6GA PC$4.25/MF$2.25
Avco Everett Research Lab Inc Everett Mass
Excimer Laser Research.
Semi-annual technical rept. 15 Aug 74-15 Feb 75,
C. A. Brau, and J. J. Ewing. Aug 75, 53p
Contract N00014-75-C-0063, ARPA Order-1806

Descriptors: *Rare gases, *Halides, *Gas lasers, Molecular energy levels, Halogens, Fluorescence, Electron beams, Excitation, Kinetics, Emission spectra, Xenon, Fluorine, Electron transitions.
Identifiers: *Excimers, Xenon halides.

This report describes a theoretical and experimental investigation of the rare gas monohalides. As a class, these molecules show great promise for achieving high power acalable laser action in the near UV portion of the spectrum. A theory has been developed to describe the structure of these molecules. The predictions of this theory are borne out by fluorescence experiments carried out in high pressure rare gas/halogen mixtures, using electron-beam excitation. The kinetics of these mixtures and their potential as high power lasers are discussed.

AD-A016 655/3GA PC$4.25/MF$2.25
Colorado State Univ Fort Collins
An Experimental and Theoretical Investigation of the Magnetization Properties and Basic Electromechanics of Ferrofluids,
T. B. Jones, and D. A. Krueger. Sep 75, 52p
Contract N00014-67-A-0299-0020

Descriptors: *Magnetization, *Colloids, Magnetic properties, Hydrodynamics, Ferromagnetic materials, Magnetic fields, Agglomerates, Fluid flow, Seals(Stoppers), Magnetite.
Identifiers: Ferromagnetic colloids, Ferrohydrodynamics, Agglomeration.

The purpose of this study is to investigate the basic magnetization processes and properties of ferrofluids and to apply these findings to the magnetic-field-coupled hydrodynamics (i.e. ferrohydrodynamics) of these colloidal liquids. This document reports progress over the last 12-month period. In basic ferrofluid properties studies, the authors have discovered a previously unreported agglomeration effect in commercially available 200 Gauss water-base ferrofluid. Upon the application of a uniform or non-uniform magnetic field, A.C. (60 Hz) or D.C., and any strength from 5 Oe to 230 Oe (limited by experimental apparatus), the formation of large agglomerates of up to 10 to the 9th power magnetite particles and with diameters from 10 to 20 micrometers has been observed. Agglomerate size increases with the magnetic field strength. The larger agglomeration effect in water-base ferrofluid can be explained theoretically as due to the larger diameter particles present in water-base fluid. Other theoretical results include (1) a calculation of the particle size dependence of the minimum magnetic field which is necessary for two particles to agglomerate, and (2) an estimate for the growth of sinking agglomerates due to scavenging.

AD-A016 760/1GA PC$4.75/MF$2.25
Monsanto Research Corp Dayton Ohio Dayton Lab
Trace Analysis for Metals in Aerospace Materials by Gas Chromatography.
Final rept. 1 Feb 72-1 Jan 75,
William D. Ross, Leo Parts, Marilyn S. Black, and Mark T. Winninger. Jun 75, 91p Rept no. MRC-DA-441 ARL-75-0189
Contract F33615-72-C-1304
See also report dated Dec 71, AD-739 865.

Descriptors: *Gas chromatography, *Beryllium, *Chromium, Chromatographic analysis, Microwave equipment, Air Force operations, Instrumentation, Air pollution, Pollutants, Soils, Coal, Extraction, Monitoring, Assessment, Separation, Waxes.
Identifiers: *Air pollution detection, Lunar structures, Diketones, Wheat plants.

Contents: Analysis for beryllium in the environment by gas chromatography-(Analysis for beryllium in ambient air particulates by gas chromatography, Analysis for beryllium in soil, coal fly ash, coal, and wheat straw); Analysis for chromium by gas chromatography, (Analysis for chromium in lunar material by gas chromatography, Chromium extraction studies, Analysis for chromium in nbs coal and fly ash); An assessment of instrumentation and monitoring needs for significant pollutants emitted by air force operations and recommendations for future research on analysis of pollutants; Development and evaluation of an atmospheric pressure microwave excited emission detector for gas chromatography; Extraction of beta-Diketones from wheat plant wax-(Extraction of wax from green wheat straw, Evaluation of separation and identification techniques, and the Extraction of components of dry wheat straw).

AD-A016 770/0GA PC$5.75/MF$2.25
IIT Research Inst Chicago Ill

Tellurium Chloride Thermoregenerative Galvanic Cell.
Final rept. 1 Mar 68-28 Feb 69,
David E. Anthes. 2 Apr 69, 145p Rept no. IITRI-C6142-5
Contract N00019-68-C-0361

Descriptors: *Electrolytic cells, Chlorides, Tellurium compounds, Gases, Stabilization, Storage batteries, Regeneration(Engineering), Reaction kinetics, Decomposition, Complex compounds, Separation.
Identifiers: *Tellurium chloride cells, Chelates.

The major problems encountered in developing a successful tellurium chloride thermally regenerative galvanic cell (TRGC) have been the regeneration of spent anolyte fluide to cell electroactive species and the subsequent separation of regenerated materials. It has been determined that complexing tellurium tetrachloride (TeCl4) with appropriate materials, while not seriously affecting cell potentials, allows liquid-gas separation of regenerated electroactive materials. The decomposition characteristics of TeCl4 and its complex compounds with gallium trichloride (GaCl3) and aluminum trichloride (AlCl3) have ben studied as approaches to efficient thermoregeneration processes. A new apparatus for the determination of the apparent limiting kinetic decomposition rates of complex materials is described. Preliminary investigations of the properties of TeCl4 complexes with iron trichloride (FeCl3), bismuth trichloride (BiCl3) and other agents were initiated in order to determine their applications as candidate materials for thermoregeneration schemes.

AD-A016 831/0GA PC$3.25/MF$2.25
Yale Univ New Haven Conn Dept of Engineering and Applied Science
Technique for Measuring the Adiabatic Compressibility, Density, and Sound Speed of Sub-microliter Liquid Samples.
Progress rept. no. 1, 1 Nov 74-31 Oct 75,
Robert E. Apfel. Oct 75, 24p
Contract N00014-67-A-0097-0023

Descriptors: *Adiabatic conditions, *Liquids, *Supercooling, *Superheating, Tensile strength, Acoustic velocity, Density, Measurement.
Identifiers: Compressibility.

An acoustical technique for measuring a known function of the adiabatic compressibility and density of a very small liquid sample (0.000004 - 0.004 ml) has been developed. The technique involves a comparison of the conditions required for the acoustic levitation of the sample at a given position in a known, immiscible 'host' liquid and the levitation of a reference droplet of known properties at the same position. It was decided to test the validity of the procedure by using liquids of known properties so that a comparison with our results would be possible. Two particularly attractive features of the procedure are: (1) the results are independent of droplet size, and (2) the parameters of the sound field need not be known. This technique should be directly applicable to measurements of properties of superheated and supercooled liquids.

AD-A016 848/4GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
Electron Impact Excitation Parameters for Selected Nitrogen and Oxygen Transitions and for Other Helium-Like Ions for HANE Applications. Volume V of the Calendar Year 1974 Annual Report to the Defense Nuclear Agency.
Annual rept.
Sep 75, 38p Rept no. NRL-MR-3133

Descriptors: *Reaction kinetics, *Nitrogen, *Oxygen, Wave equations, Ionization potentials, Excitation, Collisions, High altitude, Quantum theory, Quantum chemistry, Angular momentum, Energy levels, Electron transitions, Nuclear explosions.
Identifiers: *Nuclear explosion effects, Quantum numbers.

Distorted wave calculations are performed for HANE applications for selected transitions in atomic nitrogen and oxygen in various ionization stages. Additional calculations are done for forbidden and spin-exchange excitations in helium-like ions and atomic oxygen. These results are compared with new semiclassical calculations using an angular momentum weighted impact parameter cutoff. The agreement is shown to be particularly good.

AD-A016 905/2GA PC$3.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
Kinetics of the Oxidation of Hydrazine by Hydrogen Peroxide, Catalyzed by Copper(II).
Memorandum rept.,
Carl R. Wellman, J. Richard Ward, and Lester P. Kuhn. Aug 75, 21p Rept no. BRL-MR-2523

Descriptors: *Hydrazine, *Oxidation, *Copper, Nitrogen, Catalysts, Hydrogen peroxide, Reaction kinetics, Chemical reactions, Enthalpy, Entropy, Liquid propellants.

Hydrazine is oxidized by hydrogen peroxide in the presence of copper(II) to form nitrogen and water. The rate of reaction between stoichiometric amounts of hydrazine and hydrogen peroxide in the presence of copper(II) was followed by monitoring the rate of evolved nitrogen. The rate was first order with respect to concentrations of hydrogen peroxide and copper(II), but was independent of the concentration of hydrazine. The most likely mechanism involves formation of a copper(II) - hydrazine complex that reacts with the hydrogen peroxide. The enthalpy of activation and entropy of activation were found.

AD-A016 908/6GA PC$3.75/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
Filter Design and Unfolding Techniques for Low-Energy X-Ray Spectrometry.
Final rept.,
W. Jeffrey Klemm, and John R. Jacobson. Sep 75, 31p Rept no. BRL-MR-2529
Supersedes Rept. no. IMR-257.

Descriptors: *X ray spectroscopy, *X ray filters, Computer programs, Matrix theory, Band pass filters, FORTRAN, Nuclear radiation.
Identifiers: FILTRX computer program, UNFOLD computer program, FORTRAN 5 programming language, UNIVAC 1108 computers.

A matrix of filters for use in a passive low-energy spectrometer was designed with the aid of a computer program. The x-ray detecting element of the spectrometer was left unspecified and treated as black box. Another computer code based on matrix inversion was written to unfold energy spectra. This report discusses both codes in detail and presents an example using simulated measurements. Error analysis confirmed the utility of the approach for low-resolution spectrometry.

AD-A016 917/7GA PC$3.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Hyperfine Fields in Nd2Co17, NdCo5, and NdCo3.
Technical rept.,
R. L. Streever. Oct 75, 9p Rept no. ECOM-4361

Descriptors: *Nuclear magnetic resonance, *Cobalt alloys, *Neodymium alloys, *Intermetallic compounds, Hyperfine structure, Spin resonance, X ray spectroscopy, Amplitude, Frequency, Cryogenics.
Identifiers: Cobalt niobium.

The nuclear magnetic resonances (NMR) of Co59, Nd143, and Nd145 have been studied at 4.2K in the compounds Nd2Co17, NdCo5, and NdCo3. Co hyperfine fields in these alloys are found to depend on both the alloy and the Co site within a given alloy and vary from 30 kG to 220 kG. The Nd hyperfine fields are found to be in the range from 3.4-4.0 MG.

AD-A016 946/6GA PC$3.75/MF$2.25
Southern Research Inst Birmingham Ala
Interference Studies for Advanced Point Sampling Alarms.
Quarterly progress rept. no. 1, 28 Apr-28 Jul 75,
Walter R. Dickson, Edward B. Dismukes, and William J. Barrett. Aug 75, 28p Rept no. SORI-3496-III ED-CR-76021
Contract DAAA15-75-C-0126
See also report dated Aug 75 on Phase 1, Report on Chemical Agent and Warning Devices.

Descriptors: *Toxic agent alarms, *Gas detectors, *Gas ionization, Interference, Air pollution, Chemical warfare agents, Organic compounds, Sensitivity, Particles, GB agent, Sources, Vapors.
Identifiers: *AID(Army Ionization Detectors), Army ionization detectors.

This report comments briefly on the initial work under Phase I, which ahs been covered in detail by a separate formal report (Edgewood Arsenal Contract Report ED-CR 76009). It then discusses in detail the preliminary experimental work that has been done in preparation for and as a part of Phase II with the Army Ionization Detector (AID): determination of detector responses (1) in laboratory exposures to controlled concentrations of GB, diisopropyl methylphosphonate, n-hexyl alcohol, and tri(n-butyl)amine; (2) in sniff tests of approximately 35 organic compounds; (3) in sniff tests of approximately 50 materials associated with housekeeping practices and human activities; and (4) in a variety of indoor and outdoor environments in which there were sometimes no identified sources of air contaminants and in others obvious sources of contamination such as laboratory animals, flowering plants, automotive vehicles, industrial plants, garbage, and sewage.

AD-A016 954/0GA PC$3.75/MF$2.25
Leeds and Northrup Co North Wales Pa
Enzyme Immobilization Alternatives For the Enzyme Alarm.
Quarterly progress rept. no. 2, Oct 74-May 75,
Herman W. Levin, and Evelyn S. Erenrich. Aug 75, 47p ED-CR-76005
Contract DAA15-75-C-0053

Descriptors: *Cholinesterase, *Toxic agent alarms, Glass, Starches, Urethanes, Temperature, Enzymes, Nylon, Crosslinking(Chemistry), Surface properties, Polyacrylamides.
Identifiers: *Enzyme supports, Enzyme pads, Electrochemical enzyme alarms.

Samples of glass beads, modified starch urethane pads, nylon and urethane enzyme products which passed wash-out resistance were sent to Edgewood Arsenal. Glass bead products and nylon products do not seem suitable for the alarm. Urethane pads including chemically coupled and cross-linked enzymes and modified starch show promise in the enzyme alarm. Storage of the enzyme is satisfactory in the cold cycle but not at high temperatures.

AD-A016 975/5GA PC$3.75/MF$2.25
Missouri Univ Columbia Coll of Engineering

Studies of the Interaction of X-Rays with Liquids, Gases with Solid Surfaces and the Properties of Liquids, Gases and Plasma Systems.
Final rept. 1 Sep 67-31 Aug 73,
Truman S. Storvick. Sep 75, 28p
Contract DAAA13-68-C-0033

Descriptors: *Thermophysical properties, *Fluids, Transport, Kinetics, Density, Gases, Metals, Surface chemistry, Scattering, Plasma medium, Pressure, Temperature, Volume, Thermodynamics, X rays, Critical temperature.
Identifiers: Gas surface interactions, Critical pressure, Themis project.

The project themis contract DAAA13-68-C-0033 effort was directed toward the experimental determination of the thermophysical properties of fluids. Interpretation of these experiments and the search for theoretical and empirical schemes for predicting and correlating the results were also a major part of the effort. The work includes the study of thermal accommodation of gases on clean metal surfaces; small angle x-ray scattering by suspensions and gases in the vapor-liquid critical region; shock tube studies of plasma systems dilute in charged particles; pressure-volume-temperature-composition studies of liquids; and properties of polyatomic gases.

AD-A016 978/9GA PC$3.75/MF$2.25
Kentucky Univ Lexington
Gas Adsorption by Activated and Impregnated Carbons.
Quarterly status rept. no. 5, Apr-Jul 75,
P. J. Reucroft, and C. T. Chiou. Jul 75, 35p EC-CR-76015
Contract DAAA15-74-C-0163
See also quarterly status rept. no. 4 dated Jun 75, AD-A013 392.

Descriptors: *Desorption, *Adsorption, *Activated carbon, *Isotherms, Chloroform, Phosgene, Gases, Tables(Data).
Identifiers: Whetlerite, Dubinin-Polanyi equations.

In the period reported, equilibrium adsorption isotherms have been measured for chloroform and phosgene on BPL grade activated carbon, ASC whetlerite and four ASB impregnated carbons. The results have been analyzed in terms of the Dubinin-Polanyi isotherm equation.

COM-75-11276/3GA PC$7.25/MF$2.25
National Bureau of Standards, Washington, D.C. Office of Standard Reference Data.
Thermodynamic and Transport Properties of Ethylene and Propylene.
Final rept.,
I. A. Neduzhii. Jun 72, 211p NBSIR-75-763
Trans. of mono. Termodinamicheskie i Transportnye Svoistva Etilena i Propilena, Moscow, 1971 192p.

Descriptors: *Thermodynamic properties, *Ethylene, *Propylene, Transport properties, Enthalpy, Thermal conductivity, Viscosity, Specific heat, Translations, USSR, Acoustic velocity.
Identifiers: Virial coefficients.

A comprehensive review of the data on the thermodynamic and transport properties of ethylene and propylene is given. Subjects covered include equation of state for liquid and vapor, second virial coefficient, enthalpy, heat capacity, speed of sound, viscosity, and thermal conductivity. New experimental measurements are given for several properties, especially speed of sound, densities of the liquid and transport properties. Tables of properties covering the temperature range from 160K to 500K are given. The book has been translated into English from the original Russian.

COM-75-11370/4GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Heat Div.
The Equation of State for Ammonia.
Interim rept.,
Lester Haar, and John Gallagher. Sep 75, 27p NBSIR-75-770

Descriptors: *Ammonia, *Thermodynamic properties, Equations of state, Gases, Liquid ammonia, Temperature, Pressure, Critical temperature, Computer programs, FORTRAN.
Identifiers: High pressure.

An outline is presented of the basic results of the extensive correlation for the thermodynamic properties of ammonia recently completed at this laboratory. Computer programs are presented for the calculation of thermodynamic properties in the range including the triple point temperature to 5/3 the critical temperature and pressures from the dilute gas to 8000 bar.

COM-75-11398/5GA PC$7.50/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
Secondary Ion Mass Spectrometry Proceedings of a Workshop on Secondary Ion Mass Spectrometry and Ion Microprobe Mass Analysis held at the National Bureau of Standards, Gaithersburg, Md., September 16-18, 1974.
Special pub.,
K. F. J. Heinrich, and D. E. Newbury. Oct 75, 233p* NBS-SP-427
Library of Congress Catalog Card no. 75-619223.

Descriptors: *Mass spectrometry, *Microanalysis, *Meetings, Thermodynamic equilibrium, Geochemistry, Mathematical models.
Identifiers: Auger electron spectroscopy, Microprobe analysis, *Secondary ion mass spectrometry, Ion microprobe analysis.

This book is the formal report of the Workshop on Secondary Ion Mass Spectrometry (SIMS) and Ion Microprobe Mass Analysis held at the National Bureau of Standards in September 1974. Invited and contributed papers cover a range of topics in the SIMS field: design of SIMS instrumentation; factors affecting secondary ion collection; techniques of reducing secondary ion mass spectra to yield quantitative compositional information; comparisons of SIMS with Auger electron spectroscopy (AES); techniques of obtaining elemental depth profiles; the instrumental and physical factors affecting such profiles; and applications of SIMS to the study of geological samples. The papers include both tutorial reviews and detailed reports on current research in SIMS.

COM-75-11411/6GA PC$7.25/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
Remote Sensing of Pollutants Computerized Reduction of Long-Path Absorption Data.
Technical rept.,
V. E. Derr, M. H. Ackley, M. J. Post, and R. F. Calfee. Jul 74, 202p* NOAA-TR-ERL-302, WPL-33 NOAA-75091801
Prepared in cooperation with Environmental Protection Agency, Washington, D.C.

Descriptors: *Industrial wastes, *Air pollution, Sulfur dioxide, Carbon monoxide, Infrared spectroscopy, Computer programs, Spectroscopic analysis, Infrared spectra, Methane, Remote sensing, Hydrocarbons, Resolution, Quantitative analysis, Concentration(Composition), FORTRAN.
Identifiers: *Air pollution detection, *Long path infrared spectroscopy.

Atmospheric gaseous pollutants are very numerous in industrial regions. It is estimated that 25 or more pollutant molecules may be found in the atmosphere in significant quantities. The measurement of the concentration of each gas from the complex spectrum obtained by a long-path infrared spectrophotometer requires the fitting of trial spectra composed from a library of spectra. The fitting procedure adjusts the concentrations of the trial spectra until a 'best fit' in a least-squares sense is produced. This report is a description of the physical, mathematical, and calculational principles and procedures for the use of a digital computer program to determine concentrations of atmospheric gases in a path of a few kilometers. Detailed instructions for the computer program and a library of spectra are provided.

COM-75-11437/1GA PC$4.25/MF$2.25
National Standard Reference Data System.
Crystal Structure Transformations in Inorganic Nitrites, Nitrates, and Carbonates,
C. N. R. Rao, B. Prakash, and M. Natarajan. May 75, 60p NSRDS-NBS-53
Library of Congress Catalog Card no. 74-18389.
See also COM-72-50849.

Descriptors: *Phase transformations, *Carbonates, *Inorganic nitrates, *Nitrites, Crystal structure, Thermodynamics, Electrical properties, Dielectric properties, X ray diffraction, Reviews.

A critical survey of the data describing crystal structure transformations in inorganic nitrites, nitrates and carbonates is compiled. Data on crystallographic, thermodynamic, spectroscopic, electrical, dielectric and other properties are given for each solid. Experimental techniques used to obtain the data are given and comments on the data are included in the tables. The literature is surveyed up to June 1973. References have been selected on the basis of their pertinence to the data cited.

COM-75-11440/5GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C.
A Gas Dilution System for Arsine-Air Mixtures.
Final rept.,
Peter A. Pella, Ernest E. Hughes, and John K. Taylor. Oct 73, 16p NBSIR-73-260
See also COM-75-11441.

Descriptors: *Arsines, *Dilution, *Gases, Mixtures, Air, Calibrating, Standards, Concentration(Composition), Spectroscopic analysis.
Identifiers: Occupational safety and health.

A gas-blending system originally designed for chlorine-air mixtures was modified for producing arsine-air mixtures in the concentration range from 0.02 to 0.25 ppm. This system has been tested in order to provide accurately known concentrations of arsine-in-air for calibration of analytical monitoring devices. An analytical method has been developed for checking the concentration of arsine in the working standard and consists of the spectrophotometric measurement of an arsine-diethyldithiocarbamate complex in solution.

COM-75-11441/3GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C.
A Gas Dilution System for Hydrogen Fluoride-Air Mixtures.
Final rept.,
Peter A. Pella, Ernest E. Hughes, and John K. Taylor. Oct 73, 24p NBSIR-73-261
See also COM-75-11440.

Descriptors: *Dilution, *Gases, *Hydrogen fluoride, Air, Mixtures, Calibrating, Concentration(Composition), Standards.

Identifiers: Occupational safety and health, Ion selective electrodes.

A gas-blending system was constructed for producing hydrogen fluoride-air mixtures in the concentration range from 1 to 20 ppm for the purpose of calibrating analytical monitoring devices. The system has been tested by measuring these HF concentrations using a fluoride ion-specific electrode.

COM-75-11443/9GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C.
Development of Reference Materials for Atmospheric Analysis of the Occupational Environment: Filter Samples Containing Toxic Metals.
Final rept.,
Radu Mavrodineanu, John R. Baldwin, and John K. Taylor. Oct 73, 17p NBSIR-73-256

Descriptors: *Standards, *Gas analysis, *Industrial hygiene, *Metals, Air pollution, Gas filters, Lead(Metal), Zinc, Manganese, Cadmium, Beryllium.
Identifiers: *Standard reference materials, Occupational safety and health, Heavy metals, Indoor air pollution.

Techniques are described that may be used to prepare filters on which are deposited prescribed amounts of heavy metals, for use as reference materials in industrial atmospheric analysis. Working solutions, prepared from pure metals and highly purified acids and water, are pipetted onto the filters held in jigs to facilitate their application. The techniques were used to prepare three sets of reference materials containing the following metals: Set 1--Pb, Cd, Zn, Sn; Set 2--Pb, Zn, Mn; Set 3--Be. The amounts of each metal deposited on the filters correspond to those expected when collecting personal samples, in atmospheres when the concentrations are both below and above the TLV levels.

COM-75-11444/7GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C.
A System for Producing Test Atmospheres Containing Hydrogen Cyanide.
Final rept.,
Eugene P. Scheide, Ernest E. Hughes, and John K. Taylor. Oct 73, 13p NBSIR-73-257

Descriptors: *Hydrogen cyanide, *Dilution, *Gases, Mixtures, Calibrating, Concentration(Composition), Standards.
Identifiers: Occupational safety and health, Ion selective electrodes.

A system capable of producing well-defined test atmospheres of HCN in air (or any other desired diluent) and an analytical system for the analysis of these gas mixtures is described. This system provides a means of calibration of the various analytical systems for HCN now in use. The analytical unit of the system can also be used for the determination of hydrogen cyanide in industrial atmospheres. By collecting the HCN in a sodium hydroxide solution, and measuring the cyanide content by the use of a cyanide-ion selective electrode, concentrations of HCN in air between 5 and 500 ppm were measured. This method is rapid and convenient and can easily be performed by a technician or adapted to automation.

COM-75-11445/4GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C.
A Gas Dilution System for Acrolein.
Final rept.,
Eugene P. Scheide, Ernest E. Hughes, and John K. Taylor. Oct 73, 12p NBSIR-73-258
See also COM-75-11446.

Descriptors: *Dilution, *Gases, *Acroleins, Calibrating, Concentration(Composition), Gas chromatography, Standards, Mixtures.
Identifiers: Occupational safety and health.

A system capable of producing well-defined test atmospheres of acrolein in air (or any other desired diluent) and an analytical system for the analysis of these gas mixtures is described. Using a bulk mixture of 9.0 ppm acrolein in nitrogen, and accurately blending this with a stream of clean, dry air, concentrations between 0.05 and 0.50 ppm can be produced. This system provides a means of calibration of the various analytical systems for acrolein now in use.

COM-75-11446/2GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C.
A Gas Dilution System for Methyl Bromide.
Final rept.,
Eugene P. Scheide, Ernest E. Hughes, and John K. Taylor. Oct 73, 12p NBSIR-73-259
See also COM-75-11445.

Descriptors: *Dilution, *Gases, Bromine aliphatic compounds, Calibrating, Concentration(Composition), Gas chromatography, Mixtures, Standards.
Identifiers: *Methane/bromo, Occupational safety and health.

A system capable of producing well-defined test atmospheres of methyl bromide in air (or any other desired diluent) and an analytical system for the analysis of these gas mixtures is described. Using a bulk mixture of 1000 ppm methyl bromide in nitrogen, and accurately blending this with a stream of clean, dry air, concentrations between 5 and 100 ppm can be produced. This system provides a means of calibration of the various analytical systems for methyl bromide now in use.

COM-75-50538/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
New CO2 Pumped CW Far-Infrared Laser Lines.
Final rept.,
D. A. Jennings, K. M. Evenson, and J. J. Jimenez. Aug 75, 1p
Pub. in IEEE Jnl. of Quantum Electronics, vQE-11 n8 p637 Aug 75.

Descriptors: *Optical pumping, Carbon dioxide lasers, Far infrared radiation, Ethyl alcohol, Chloromethane, Chloroethane, Quantum electronics.
Identifiers: Reprints.

A single-frequency CW CO2 laser has been used to pump ethyl alcohol, methyl chloride, ethyl chloride, and methylene chloride, generating 8 new CW far-infrared (FIR) laser lines from 254 to 1700 micrometers.

COM-75-50541/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Silicon Monoxide: Detection of Maser Emission from the Second Vibrationally Excited State.
Final rept.,
David Buhl, Lewis E. Snyder, Frank J. Lovas, and Donald R. Johnson. 1 Sep 74, 4p
Pub. in Astrophysical Jnl., v192 pL97-L100, 1 Sep 74.

Descriptors: *Microwave spectra, *Silicon monoxide, Variable stars, Interstellar matter, Nebulae, Masers, Energy levels, Vibrational spectra, Extraterrestrial radio waves.
Identifiers: Orion nebula, Reprints.

The J = 1-0 rotational transition of the second vibrational state (v=2) of SiO has been detected in late M-type variable stars and in the center of the Orion Nebulae. This transition of SiO requires 3520K of excitation for pumping the observed maser line. The ground (v=0) and third (v=3) vibrational states were not detected.

COM-75-50542/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Determination of Chain Statistical Parameters by Light Scattering Measurements.
Final rept.,
Jacob Mazur, and Donald McIntyre. Aug 75, 13p
Pub. in Macromolecules, v8 n4 p464-476 Jul/Aug 75.

Descriptors: *Light scattering, *Polymers, Monte Carlo method, Polystyrene, Organic solvents, Conformal mapping, Solutions, Statistical analysis.
Identifiers: Molecular conformation, Reprints.

The effects of volume exclusion on polymer chain conformations can be determined from the study of the angular dependence of radiation scattered by chain molecules. It was found that solutions of macromolecules of very high molecular weight are needed for these investigations. The scattering behavior of solutions of recently synthesized polystyrene of (M sub w) = 4.4x10 to the 7th power in cyclohexane at various temperatures and in benzene at 40C was investigated. From the log-log plots of the scattering function vs. x, a statistical parameter was calculated, whose value depends on the magnitude of long-range correlations between any pair of chain elements. It is found that above the theta temperature the parameter is practically independent of temperature and that its numerical value was found to agree well with the value obtained from Monte-Carlo calculations. In the neighborhood of the theta temperature, this parameter decreases rapidly with decreasing temperature, indicating a first-order transition in chain conformation.

COM-75-50544/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Short-Wavelength Collective Excitations in Liquid Rubidium Observed by Coherent Neutron Scattering.
Final rept.,
J. R. D. Copley, and J. M. Rowe. 14 Jan 74, 4p
Sponsored in part by Argonne National Lab., Ill.
Pub. in Physical Review Letters, v32 n2 p49-52, 14 Jan 74.

Descriptors: *Rubidium, *Liquid metals, Neutron scattering, Excitation.
Identifiers: Reprints, Liquid rubidium.

The short wavelength collective excitations in liquid rubidium at 320K have been studied by coherent neutron scattering. For values of Q=2(pi)/lambda up to 1-0/A, clear evidence of propagating modes was found from the shape of the scattering function S(Q,omega) at constant values of Q. This result shows that the existence of such modes does not depend upon either quantum effects or low thermal population of the modes.

COM-75-50546/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Mechanism and Rate Constant of the Reaction Between Methylene and Methyl Radicals.
Final rept.,
Allan H. Laufer, and Arnold M. Bass. 1975, 4p
Sponsored in part by National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center, and Department of Trans-

portation, Washington, D.C. Climatic Impact Assessment Program.
Pub. in Jnl. of Physical Chemistry, v79 n16 p1635-1638 1975.

Descriptors: *Aliphatic hydrocarbons, *Photolysis, *Free radicals, Reaction kinetics, Azo compounds.
Identifiers: Reprints, Methylene carbenes, Methyl, Flash photolysis.

The chemistry of the reaction between methyl and triplet methylene radicals has been examined by means of flash photolysis of azomethane and ketene followed by gas chromatographic analysis of the hydrocarbon products. Using the combination rate constant of triplet CH2 and the combination of CH3 a value for the reaction 3CH2 + CH3 to C2H5* to C2H4 + H has been determined.

COM-75-50548/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Stability of Aqueous Ethanol Solutions Stored in Glass Ampules.
Final rept.,
P. A. Pella, and B. I. Diamondstone. 1975, 2p
Pub. in Jnl. of Forensic Sciences Technical Note, v20 n3 p537-538 1975.

Descriptors: *Ethyl alcohol, Performance standards, Solutions.
Identifiers: *Breath alcohol analysis, Forensic techniques, Reprints.

Stability studies were carried out on ampules samples of ethanol-water solutions. These solutions are used to measure performance capabilities of breath alcohol detection instruments.

COM-75-50550/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Adsorption of Xenon by W(111), and Its Interaction with Preadsorbed Oxygen.
Final rept.,
Miles J. Dresser, Theodore E. Madey, and John J. Yates, Jr. 1974, 19p
Pub. in Surface Science, v42 p533-551, 1974.

Descriptors: *Surface chemistry, *Xenon, *Tungsten, *Oxygen, Binding energy, Adsorption, Desorption, Work functions.
Identifiers: Reprints.

The physisorption of Xe on W(111) and of Xe on partial layers of oxygen chemisorbed on W(111) has been studied using flash desorption and work function methods. It has been found that xenon adsorbs up to monolayer coverages at 104 K. Xenon desorbs from W(111) as a single binding state following first order kinetics. At low coverages (theta Xe < 0.07) the binding energy decreases with increasing coverage possibly because of the presence of high energy adsorption sites due to crystal imperfections and edge effects. The observed work function change of -1.1 + or - .1 eV is consistent with monolayer estimates reported in field emission studies of physisorbed xenon on tungsten. The effect of preadsorbed oxygen layers on the physisorption of xenon on this surface is very striking. The energy of desorption shifts as much as 50% higher for a moderate exposure of oxygen. Several physisorption models are explored along with estimates of dispersion and electrostatic interaction contributions.

COM-75-50561/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Experimental Study of Surface and Lattice Effects on the Solubility of Hydroxyapatite.
Final rept.,
Robert Chuong. Oct 73, 4p
Sponsored in part by American Dental Association, Chicago, Ill.
Pub. in Jnl. of Dental Research, v52 n5 suppl p911-914 Sep/Oct 73.

Descriptors: *Solubility, *Surface chemistry, Lattice parameters, Surface properties, Dissolving, Crystal lattices, Solutions.
Identifiers: *Hydroxyapatite, Reprints.

Brown et al have formulated a thermodynamic treatment for the solubility of hydroxyapatite in which recognition of a distinction between surface and lattice contributions is explicitly made. Verification of the applicability of this aproach to the Ca(OH)2-H3PO4-H2O system has been carried out by Avnimelech et al. The purpose of the present study is to apply the theory of Brown et al to the quaternary system Ca(OH)2-H3PO4-H2O-HCl. The findings indicate that the Ca/P ratios in the final solutions varied with both the solid-to-solution ratio and the initial HCl concentration. However, the ion activity products for hydroxyapatite were essentially constant. These results indicate that the contribution of the surface to the overall dissolution reaction relative to that of the lattice must be taken into account, but in conformity with theory standard solubility product principles are applicable to the final equilibrium reaction.

COM-75-50570/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Infrared Laser Enhanced Reactions: V to V and V to T Energy Transfer in the O3-SiF4-O2 System.
Final rept.,
Walter Braun, Michael J. Kurylo, and Andrew Kaldor. 1 Oct 74, 5p
Sponsored in part by Department of Transportation, Washington, D.C. Climatic Impact Assessment Program.
Pub. in Chemical Physics Letters, v28 n3 p440-444, 1 Oct 74.

Descriptors: *Energy transfer, *Ozone, *Oxygen, *Silicon halides, Reaction kinetics, Infrared lasers, Luminescence, Molecular vibration, Excitation, Modulation, Ions.
Identifiers: Reprints, Laser excitation, Vibrational energy levels, DOT/5N.

Rapid V to V energy transfer between SiF4 and O3 has been observed following CO2 laser excitation of either O3 or SiF4. In experiments employing the P(32) transition the V to V transfer to O3 and subsequent reaction of O3(+) with NO were used to obtain the rate constant of V to T deactivation of SiF4 by O2. Fractional modulation measurements of the chemiluminescence generated by the O3 + NO reaction were used in experiments employing the P(30) transition to obtain a rate constant for the V to V energy transfer between O3(+) and SiF4.

COM-75-50584/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Dependence of Diffusive Transport on Morphology of Crystalline Polymers.
Final rept.,
A. Peterlin. 1975, 31p
Pub. in Jnl. of Macromolecular Science B, v11 n1 p57-87 1975.

Descriptors: *Diffusion, *Polymers, Morphology, Transport properties, Permeability.
Identifiers: Reprints.

The sorption and diffusion of low molecular weight penetrants proceeds almost exclusively through the amorphous component of the semicrystalline polymer solid. The diffusive transport properties and geometrical distribution of the amorphous component are substantially modified by mechanical and thermal treatment. Deformation of spherulitic material first loosens the structure and then transforms it into a densely packed fibrous structure with a great many taut tie molecules in the amorphous component. Annealing lets the crystals grow in thickness, removes crystal defects, smoothes the boundaries between crystalline and amorphous component, and relaxes the taut tie molecules. The resulting changes of transport properties cannot be described in a satisfactory manner by crystallinity and orientation but require a detailed consideration of morphology. The tensile deformation enhances sorption and diffusion by reducing the density of amorphous component. This report discusses the diffusion differences.

COM-75-50590/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Sampling Reactive Species from Flames by Mass Spectrometry.
Final rept.,
J. W. Hastie. Jan 75, 12p
Pub. in International Jnl. of Mass Spectrometry and Ion Physics, v16 n1/2 p89-100 Jan 75.

Descriptors: *Flames, *Mass spectra, Probes, Ions.
Identifiers: Reprints, Laser excitation.

Recent studies on sampling reactive species from flames and related laser-excited systems are described. Consideration is given to the possible effect of probe-related perturbations on the experimental data. It is concluded that such perturbations are not significant under the present experimental conditions.

COM-75-50603/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Hexakis (Imidazole) Cobalt (II), (Co(C3H4N2)6)(NO3)2.
Final rept.,
E. Prince, A. D. Mighell, C. W. Reimann, and A. Santoro. 1972, 6p
Pub. in Cryst. Struct. Commun., v1 p247-252 1972.

Descriptors: *Crystal structure, *Cobalt inorganic compounds, *Imidazoles, *Metal complexes, Inorganic nitrates, Complex compounds, Intermolecular forces, Hydrogen bonds.
Identifiers: Reprints.

The structure of the title compound was determined by x-ray and neutron diffraction techniques. The hydrogen bonding in the structure was uniquely determined from the neutron data. Bond distances and angles obtained with the two techniques are compared.

COM-75-50607/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Crystal Structure of 1,3,5,7-Tetraceto-1,3,5,7-Tetrazacyclo-Octane.
Final rept.,
C. S. Choi, J. E. Abel, B. Dickens, and J. M. Stewart. Apr 73, 6p
Pub. in Acta Crystallographica B, v29 pt4 p651-656 Apr 73.

Descriptors: *Crystal structure, *Molecular structure, *Nitrogen heterocyclic compounds, X ray diffraction.
Identifiers: Reprints, *Tetraazacyclooctanes, Molecular conformations.

The crystal of 1,3,5,7,tetraceto-1,3,5,7,tetrazacyclo-octane, C12N4O4H20, is tetragonal, a = b = 10.540(2) and c = 12.137(3)A with 4 molecules per unit cell. Systematic absences are consistent with space group P41212. The structure was solved by direct methods and refined to a final R-index

wR = 0.037 and R = 0.039 for 1244 observed reflections. The molecule consists of alternate CH2 and N-CO-CH3 groups in a puckered C-N ring, having boat shape conformations with a two-fold rotation axis through the center of the CN ring. The heavy atoms of each acetyl group are essentially coplanar with the N atom in the ring. The molecular thermal motion may be represented chiefly by three motions.

COM-75-50611/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Models of Diffusion in Lyotropic Liquid Crystals.
Final rept.,
Marvin Bishop, and Edmund A. Dimarzio. 1975, 23p
Pub. in Molecular Crystals and Liquid Crystals, v28 p311-333 1975.

Descriptors: *Liquid crystals, *Diffusion, Diffusion coefficient, Mathematical models, Dynamics, Asymmetry.
Identifiers: DASH model, Reprints.

The asymmetric diffusion of small molecules in a liquid crystal host is examined via three models. The small molecules are represented by spheres and the liquid crystal host by aligned cylinders. DASH is a continuum model which allows one to use the results of electrical conductivity problems to calculate the diffusion coefficient. LASH is an extension of polymer lattice counting models. CASH is a molecular dynamics computer simulation which provides experimental data to check the analytical models. It is found that DASH is better representation of the diffusion asymmetry than LASH for the low liquid crystal densities examined on the computer. The cylinder sphere pair correlation function is also calculated in CASH and this gives evidence for liquid order around the liquid crystals.

COM-75-50612/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Continuum Spectra and Potentials of Li-noble Gas Molecules.
Final rept.,
R. Scheps, Ch. Ottinger, G. York, and A. Gallagher. 15 Sep 75, 10p
Contract N00014-67-A-0405-0008
Sponsored in part by Air Force Weapons Lab., Kirtland AFB, N. Mex.
Pub. in Jnl. of Chemical Physics, v63 n6 p2581-2590, 15 Sep 75.

Descriptors: *Lithium, *Emission spectra, *Rare gas compounds, *Visible spectra, Atomic spectra, Molecular spectra, Potential energy.
Identifiers: Reprints.

The normalized emission spectrum of the Li(2p-2s) resonance transition has been measured in the presence of 10 - 1,000 Torr of noble gas. Fluorescence at 100 - 3,000 A from the atomic line, due the A - X and B - X bands of Li-noble gas molecules, has been measured as a continuum with 15 A resolution. The lithium is optically excited in a 670K cell. The lithium is optically thin so that the continuum emission per excited lithium atom is obtained from the normalized emission. The attractive A-state potentials for Li-Ar, Kr, and Xe have been constructed by analysis of the A - X band spectra in the limit of high and low noble-gas densities. At high densities each spectrum is due to an equilibrated vibrational distribution of A-state molecules, whereas at low densities only free collision states contribute. The ratio of the two spectra thus depends on the excited state potential and has been used to determine this potential where it is attractive. Absorption and stimulated emission coefficients for Li-noble gas vapors are also deduced from the data.

COM-75-50614/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
High-Resolution Infrared Spectrum of the (nu sub 2) + (nu sub 3) Band of 14N16O2.
Final rept.,
R. L. Sams, and W. J. Lafferty. 1975, 12p
Pub. in Jnl. Molecular Spectroscopy, v56 p399-410 1975.

Descriptors: *Nitrogen dioxide, *Infrared spectra, Molecular energy levels, Resolution, Vibrational spectra.
Identifiers: Reprints, Vibrational energy levels.

The (nu sub 2) + (nu sub 3) band of (14)N(16)O2 has been recorded with resolution of 0.028/cm. Ground state and upper state rotational constants have been obtained. The band center obtained has been combined with the band centers recently determined for (nu sub 3) and (nu sub 2) to calculate X23 = -11.349 plus or minus 0.010/cm.

COM-75-50616/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Spectrum of Rb Observed with a Pulsed-rf Light Source.
Final rept.,
Joseph Reader. Sep 75, 3p
Pub. in Jnl. of the Optical Society of America, v65 n9 p988-990 Sep 75.

Descriptors: *Rubidium, *Atomic spectra, Ions, Atomic energy levels.
Identifiers: Reprints.

The spectrum of doubly ionized rubidium, Rb III, was observed with a pulsed-rf light source on two 10.7 m normal-incidence spectrographs at NBS. Wavelengths and classifications were obtained for 103 Rb III lines, 90 of which were newly observed. Improved values were determined for 13 excited levels.

COM-75-50617/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The O K(alpha) and C K(alpha) Emission and O K Absorption Spectra from O2 and CO2. IV.
Final rept.,
Robert E. LaVilla. 15 Sep 75, 5p
Pub. in Jnl. of Chemical Physics, v63 n6 p2733-2737, 15 Sep 75.

Descriptors: *Oxygen, *Carbon dioxide, *X ray spectra, Emission spectra.
Identifiers: Reprints.

The oxygen and carbon K alpha emission and oxygen K absorption spectra of the molecular gases O2 and CO2 are reported. The spectra were obtained on two different spectrometers, both with single flat crystal configurations. All the emission spectra were excited by direct electron bombardment and are in fair agreement with an interpretation based on allowed electric dipole transitions between single vacancy states and molecular orbital theory for the molecules. The oxygen K absorption of O2 and CO2 is dominated by a strong resonance peak before the K-shell threshold which is interpreted as due to the transition of oxygen K electrons to the first unoccupied valence orbital of the respective molecules.

COM-75-50618/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Seventh Spectrum of Tungsten(W VII); Resonance Lines of Hf V.
Final rept.,
Jack Sugar, and Victor Kaufman. Sep 75, 19p
Sponsored in part by Energy Research and Development Administration, Washington, D.C.
Pub. in Physical Review A, v12 n3 p994-1012 Sep 75.

Descriptors: *Tungsten, *Ultraviolet spectroscopy, *Atomic energy levels, Hartree-Fock approximation, Ionization potential, Wavelengths.
Identifiers: Reprints.

Observations of W(VII) were carried out in the spectral range 100 to 2000 A using normal- and grazing-incidence spectrographs. The light source was a sliding spark operated at peak currents of 1000 to 3000 A. Eighty-five energy levels of 4f(13) nl and 5p(5) nl configurations were deduced for nl = 5d, 6s, 6p, 6d, and 7s. These are based on the classification of 310 lines in the range 130 to 1436 A. Calculations of all observed configurations were carried out with configuration interaction (CI) for the purpose of fitting radial integrals and confirming the analysis. The strong CI between p(5) nl and f(13) nl configurations were nl = 5d, 6p, 6d provided well-defined CI integrals in good agreement with Hartree-Fock values. The resonance lines of Hfv for 5p(6)-5p(5)5d,6s are given. A revised value for the ionization energy of W(VI) is given.

COM-75-50619/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Pyrolysis of Ethylamine. I. Microwave Spectrum and Molecular Constants of Vinylamine.
Final rept.,
Frank J. Lovas, Frank O. Clark, and Eberhard Tiemann. 1 Mar 75, 7p
Pub. in Jnl. of Chemical Physics, v62 n5 p1925-1931, 1 Mar 75.

Descriptors: *Microwave spectra, *Ethylamine, Gases, Pyrolysis, Decomposition products, Hyperfine structure, Stark effect, Excitation.
Identifiers: *Vinylamines, Reprints.

Microwave rotational spectra assignable to gas phase vinylamine (CH2=CHNH2) have been detected in the pyrolysis decomposition products of ethylamine. Stark effect and hyperfine structure measurements have aided the assignment of the spectrum and allow the determination of the 14N nuclear electric quadrupole coupling constants and the electric dipole moment for vinylamine. The spectrum of the first excited inversion vibrational state has been assigned.

COM-75-50622/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Application of Microwave Spectroscopy to Chemical Analysis.
Final rept.,
Frank J. Lovas. 1974, 7p
Pub. in Analysis Instrumentation, v12 p103-109 1974.

Descriptors: *Chemical analysis, *Microwave spectroscopy, Chemical reactions, Vapor phases, Pyrolysis, Decomposition reactions, Gases.
Identifiers: Reprints.

Traditional analytical techniques have been successfully employed on a great variety of systems for identifying stable reaction products as well as for purity analysis and reaction efficiency. However, most analytical techniques generally can only be applied to 'well behaved' chemical systems. Since gas phase reaction products do not always follow the 'well behaved' guideline, an alternate analytical tool, such as microwave spectroscopy, could prove beneficial for analyzing such systems and may well provide some new routes to synthetic chemistry. A general review of the present state-of-the-art for applications of microwave techniques to analytical studies is presented. An attempt is made to describe the limitations and advantages of microwave spectroscopy for probing chemical systems for product identification and for optimization of the efficiency of

gas phase chemical reactions. As an illustration, some recent results obtained in our laboratory on the complex pyrolytic decomposition reactions of ethylamine is described. Further examples of possible applications are taken from typical industrial processes which employ vapor phase chemical synthesis techniques.

COM-75-50625/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Study of Hydrogen Diffusion in Tantalum Hydrides by Inelastic Neutron Scattering.
Final rept.,
J. J. Rush, R. C. Livingston, L. A. de Graaf, H. E. Flotow, and J. M. Rowe. 15 Dec 73, 7p
Sponsored in part by Argonne National Lab., Ill.
Pub. in Jnl. of Chemical Physics, v59 n12 p6570-6576, 15 Dec 73.

Descriptors: *Hydrogen, *Diffusion, *Tantalum, Hydrides, Activation energy, Neutron scattering, Inelastic scattering.
Identifiers: Reprints, Tantalum hydrides.

Neutron inelastic scattering spectra have been measured as a function of temperature and scattering angle for alpha TaH(0.15) and for Ta2H in its alpha and beta sub 1 phases. The widths of the quasielastic peaks vs. momentum transfer (Q) have been derived and compared with several models for hydrogen diffusion. The results suggest the dominance of tetrahedral jumps in the diffusion process, although no completely satisfactory theoretical fit was obtained. Residence times tau between 1.6 (340C) and 4.0 ps (148C) for TaH(0.15) and between 2.4 (300C) and 7 ps (153C) were derived from the fit of the observed widths to the tetrahedral model. On the basis of this comparison it is tentatively concluded that the very high 'Debye-Waller factors' obtained for VH(x) and some other hydrides are related to high hydrogen diffusion rates (gas like behavior).

COM-75-50631/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
CO2 TEA Laser-Induced Photochemical Enrichment of Boron Isotopes.
Final rept.,
S. M. Freund, and J. J. Ritter. 15 Apr 75, 6p
Pub. in Chemical Physics Letters, v32 n2 p255-260, 15 Apr 75.

Descriptors: *Boron isotopes, Hydrogen sulfide, Photochemistry, Infrared radiation, Gases, Laser beams.
Identifiers: *Isotope enrichment, Boron chlorides, *Laser isotope separation, Boron 10, Reprints.

Mixtures of BCl3 and H2S were irradiated with 10.55 micrometer radiation (P(16) line of the 001-100 band of CO2) from a TEA laser. After several hours of irradiation it was found that the 10B concentration was increased from 19.5% to 29.2%. Further, by irradiating similar mixtures with 10.18 micrometer radiation (R(30) line of the same CO2 vibrational band) this ratio changes to 0.169 plus and minus 0.002, the 10B concentration being lowered to 14.4%. All experiments are performed in a small static system and chemical procedures for recovering milligram quantities of BCl3 selectively enriched in either isotope are described.

COM-75-50632/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
A Refinement of the Structure of Deuterium Peroxide.
Final rept.,
E. Prince, S. F. Trevino, C. S. Choi, and M. K. Farr. 15 Sep 75, 5p
Pub. in Jnl. of Chemical Physics, v63 n6 p2620-2624, 15 Sep 75.

Descriptors: *Hydrogen peroxide, *Molecular structure, *Deuterium compounds, Least squares method, Neutron diffraction, Chemical bonds, Vapor phases, Tetragonal lattices.
Identifiers: Reprints.

The structure of deuterated hydrogen peroxide, D2O2, at minus 15C was refined by least-squares method from three dimensional neutron diffraction data. The data were fitted to two models, one with the molecule treated as a rigid body except for torsional oscillations of the O-D groups about the O-O bond. The weighted agreement indices were 0.030 over 106 observed reflections for the conventional model and 0.032 over 102 reflections for the rigid body model. The structure is tetragonal, space group P4(1)2(1)2 or Pr(3)2(1)2 with a-4.035 A, c=7.97 A, Z=4. Position parameters for the two models are essentially the same. The O-O distance in the molecule, 1.455(2) A, is identical to that found in H2O2, but the O-D bond is about 0.015 A shorter than the O-H bond, 0.993 A as compared with 1.008 A when corrected for thermal motion by the riding model. The O-O distance corrected for thermal motion in the rigid body is 1.49 A, in fair agreement with the value 1.48 A found in the vapor phase.

COM-75-50634/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
NBS Replies to Dr. Barnett's Critique.
Final rept.,
Peter W. Finkel, Ted R. Miller, and M. Keith Weikel. Apr 74, 2p
Pub. in Lab World, v25 n4 p6 and 16, Apr 74.

Descriptors: *Chemistry.
Identifiers: Critiques, Reprints.

The December 1973 issue of LAB WORLD published a critique of two NBS Interagency Reports. The Bureau has prepared a reply, written by the senior author of both NBS reports, and coordinated through the Institutes for Applied Technology and Materials Research.

COM-75-50636/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Recent Applications of the Multiconfiguration Self-Consistent Field Method to Polarizabilities, Excited States, Van der Waals Forces, and Triatomic Surfaces.
Interim rept.,
A. Karo, M. Krauss, and A. C. Wahl. 1973, 17p
Pub. in International Jnl. of Quantum Chemistry, Symposium, n7 p143-159 1973.

Descriptors: *Polarization(Spin alignment), *Molecular orbitals, *Quantum chemistry, Symmetry, Shape, Potential energy.
Identifiers: *Van der Waals forces, Self consistant field wave functions.

In this brief presentation recent and new applications of the multiconfiguration self-consistent field (MCSCF) method to the direct calculation of atomic polarizabilities, excited states of the same symmetry, Van der Waals forces, and triatomic energy surfaces are presented. These calculations using the BISON system, have been carried out over the past several years as part of collaborative research between Argonne National Laboratory, the National Bureau of Standards, and the Lawrence Livermore Laboratory.

COM-75-50638/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Determination of the Avogadro Constant.
Final rept.,
R. D. Deslattes, A. Henins, H. A. Bowman, R. M. Schoonover, and C. L. Carroll. 19 Aug 74, 4p
Pub. in Physical Review Letters, v33 n8 p463-466, 19 Aug 74.

Descriptors: *Crystal lattices, Isotopes, Silicon, Density(Mass/volume).
Identifiers: Reprints, *Avogadro number.

Measurements are reported on the densities and isotopic-abundance ratios of nearly perfect Si single crystals. These, when combined with optical interferometry of the crystal repeat distance, yield a new value for the Avogadro constant. This result, N(A)=6.022 0943 x 10 to the 23rd power/mol (1.05 ppm), represents a more than thirty-fold reduction in the uncertainty of previous direct measurements.

COM-75-50642/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Angular Distribution of N+ from Dissociative Ionization of N2 Near Threshold.
Final rept.,
R. J. Van Brunt, and L. J. Kieffer. 15 Oct 75, 6p
Grant NSF-GP-39308
Pub. in Jnl. of Chemical Physics, v63 n8 p3216-3221, 15 Oct 75.

Descriptors: *Nitrogen, *Gas ionization, Ions, Kinetic energy.
Identifiers: Reprints, Nitrogen ions.

Translational kinetic energy and angular distributions of N(+) from dissociative ionization of N2 have been measured at electron energies close to threshold. For electron energies above 50 eV the energy distributions agree favorable with earlier measurements of Kieffer and Van Brunt. The ion energy distributions at electron energies below 50 eV are dominated by a feature peaked at a kinetic energy below 1 eV in agreement with recent measurements of Locht et al. For electron energies closest to threshold the angular distribution of N(+) associated with this feature is consistent with the previously proposed mechanism involving excitation of the C doublet Sigma (u) (+) state followed by predissociation.

COM-75-50643/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Angular Distribution of Photoelectrons: Outer Shells of Noble Gases.
Final rept.,
Steven T. Manson, and John W. Cooper. Nov 70, 2p
Pub. in Physical Review A, v2 n5 p2170-2171 Nov 70.

Descriptors: *Photoelectrons, *Rare gases, Atomic orbitals, Asymmetry.
Identifiers: Reprints.

Results of calculations of angular distributions of photoelectrons from the outer p subshells of Ne, Ar, Kr, and Xe are presented for electron energies between 0 and 2 Ry (27.2 eV).

COM-75-50644/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Atomic Spectroscopy - Some Data Centers and Compilations.
Final rept.,
W. C. Martin. 1974, 4p
Pub. in Proceedings of International CODATA Conference on Generation, Compilation, Evaluation and Dissemination of Data for Science and Technology (4th), Tsakhcadzor (U.S.S.R.), 24-27 Jun 74, CODATA Bulletin, n14 p112-115 1974.

Descriptors: *Atomic energy levels, *Information centers, Data acquisition.

The operation and current work of the NBS Atomic Energy Levels Data Center is reviewed briefly, and some of the other activities of this type, at NBS and elsewhere, are noted. The data

include atomic wavelengths, energy levels, transition probabilities and line shapes and shifts, and gas laser transition data. References to some recent and forthcoming compilations of atomic spectral data are included.

COM-75-50645/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The NSRDS Experience.
Final rept.,
David R. Lide, Jr. 1974, 4p
Pub. in Proceedings of International CODATA Conference on Generation, Compilation, Evaluation, and Dissemination of Data for Science and Technology (4th), Tsakhcadzor (U.S.S.R.), 24-27 Jun 74, CODATA Bulletin, n14 p6-9 1974.

Descriptors: *Standards, Chemistry, Data sources.
Identifiers: *National Standard Data Reference System.

The Standard Reference Data Program deals primarily with physical and chemical property data. The properties covered are well-defined, measurable properties and the systems include pure substances and mixtures that can be adequately characterized. There is a strong emphasis on critical evaluation of the data by experienced scientists. The program is managed by the National Bureau of Standards under a mandate from the Congress of the United States to make critically evaluated reference data readily available to scientists, engineers and the general public.

COM-75-50646/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Liquid-Vapor Asymmetries in Pure Fluids.
Final rept.,
George W. Mulholland, John A. Zollweg, and J. M. H. Levelt Sengers. 1 Apr 75, 15p
Pub. in Jnl. of Chemical Physics, v62 n7 p2535-2549, 1 Apr 75.

Descriptors: *Liquids, *Critical point, Asymmetry, Phase transformations.
Identifiers: Reprints, *Ising model.

The coexistence curve and the compressibility-like quantity (the partial derivative of rho with respect to mu at constant T) at the coexistence curve are calculated for Mermin's decorated lattice gas. The Pade approximants was tabulated to the Ising model properties which were used in these calculations. It is shown that for the proper choice of the adjustable parameter in the model the asymmetries in the coexistence curve. Also, similar correlations between the over-all coexistence curve asymmetry and the amplitudes of divergences for the critical region occur in the model and in real fluids. Based on our model calculations, several predictions for fluid behavior near the critical point are listed.

COM-75-50647/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
A New Technique for Thermal Analysis of Vapor-Producing Reactions.
Final rept.,
R. J. McCarter. 1973, 14p
Pub. in Jnl. of Applied Polymer Science, v17 n6 p1833-1846 1973.

Descriptors: *Laboratory equipment, *Pyrolysis, *Differential thermal analysis, Reaction kinetics, Vapors, Thermogravimetric analysis.
Identifiers: Reprints.

An apparatus was developed for measuring the rate at which vapors are evolved during the thermal degradation of materials and thereby deriving the kinetics of such reactions. Requisite to the operating scheme of the apparatus is the provision of a high-temperature zone to convert condensable or tarry vapors into non-condensable form. The apparatus yields a direct measure of reaction velocity, rather than the integrated indication obtained with thermogravimetric analysis. This simplifies the identification and calculation of kinetic parameters. Increases in sensitivity and operating range are also achieved. Flexibility in operation is obtained that permits the separate recording of reactions that tend to overlap. Although the apparatus principally has been operated using a combustible gas indicator to meter the evolved vapors, a number of options are available for the latter function, including flow meters and various continuous gas analyzers.

COM-75-50649/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
High-Resolution Infrared Spectrum of the v1 + v3 Band of Ozone.
Final rept.,
Arthur G. Maki. 1975, 12p
Pub. in Jnl. of Molecular Spectroscopy, v57 n3 p416-427 1975.

Descriptors: *Ozone, *Infrared spectra, Resolution, Absorption spectra, Molecular energy levels.
Identifiers: Reprints.

The 1 + 3 band of ozone (03) near 2110/cm has been measured and analyzed using a Watsontype Hamiltonian including all seven sextic centrifugal distortion terms. Two weak perturbations have been found between K = n of 1 + 3 and K = n + 3 of 23. Those perturbations locate the band center for 23 at about 2058/cm. Aside from those perturbations the interactions of 1 + 3 with 21 and 23 have not been taken into account in the analysis. Effective band constants and an atlas listing line wavenumbers and assignments are given.

COM-75-50650/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Molecular Dynamics Calculation of the Thermodynamic Properties of Methane.
Final rept.,
H. J. M. Hanley, and R. O. Watts. 1975, 10p
Pub. in Australian Jnl. of Physics, n28 p315-324 1975.

Descriptors: *Methane, *Thermodynamic properties, Liquefied gases, Intermolecular forces, Specific heat.
Identifiers: Liquid methane, Reprints, Dense gases.

Thermodynamic properties of methane in the dense gas and liquid states have been calculated by the method of molecular dynamics. The methane pair interactions were modelled using a spherically symmetric m-6-8 potential, and the most significant three-body and quantum effects were included. Agreement between calculated and experimental values for the energy and pressure is generally good except at low temperatures and high densities. The specific heat at constant volume is also briefly discussed.

COM-75-50658/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Standard Reference Data System.
Final rept.,
D. R. Lide, Jr. Nov 71, 2p
Pub. in Chemical Engineering Progress, v67 n11 p77-78 Nov 71.

Descriptors: *Standards, *Chemical engineering, Data sources.
Identifiers: *National Standards Reference Data System, Reprints.

The National Standard Reference Data System (NSRDS) represents an effort to provide critically evaluated numerical data in the physical sciences. It is a decentralized program coordinated from the National Bureau of Standards, but enlisting the help of experts throughout the country. Activities of interest to chemical engineers are discussed.

N75-31228/0GA PC$7.50
Engineering Sciences Data Unit, London (England).
Approximate Data on the Viscosity of Some Common Liquids.
May 75, 34p ESDU-66024
Misc-Amendment a.

Descriptors: *Temperature effects, *Viscosity, Density (Mass/volume), Fluid dynamics, Graphs (Charts), Lubricants, Temperature gradients, Viscous flow.

For abstract, see STAR 1322

N75-31235/5GA PC$3.75/MF$2.25
European Space Research Organization, Paris (France).
Separation of Nitrogen and Oxygen in Laminar Hypersonic Boundary Layers at Thermochemical Equilibrium of Air.
H. Eickhoff, and F. Thiele. Mar 75, 33p ESRO-TT-154, DLR-FB-74-63
Tran-Transl. Into English of "Entmischung von Stickstoff U. Sauerstoff in Laminaren Hyperschallgrenzschichten bei Lokalem Thermochemischen Gleichgewicht der Luft", Tech. Univ. Berlin Report Dlr-FB-74-63, 20 Aug. 1974.
Misc-Original German Report Available from Dfvlr, Porz, West Ger. 15.30 Dm.

Descriptors: *Chemical equilibrium, *Gas dissociation, *Hypersonic boundary layer, *Nitrogen, *Oxygen, Air, Hydrodynamic equations, Laminar boundary layer, Thermodynamic equilibrium.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31379/1GA PC$3.75/MF$2.25
Kent State Univ., Ohio.
Transport of Trace Contaminants Through Porous Media.
Semiannual Status Report, 16 Mar. - 15 Sep. 1975.
R. Madey. 15 Sep 75, 31p NASA-CR-143432, KSUPD-TR-75-4
Grant NSG-2013

Descriptors: *Porous materials, *Trace contaminants, *Transport properties, Acetaldehyde, Carbon, Data reduction, Gas chromatography, Tables (Data).

For abstract, see STAR 1322

N75-31380/9GA PC$5.75/MF$2.25
Illinois Univ., Chicago. Dept. of Energy Engineering.
Turbulent Chemically Reacting Flows According to a Kinetic Theory.
Ph.D. Thesis.
Z. C. Hong. Aug 75, 150p NASA-CR-143453, TRE-75-9
Grant NSG-1150

Descriptors: *Chemical reactions, *Flow theory, *Gas flow, *Kinetic theory, *Statistical analysis, *Turbulent flow, Degrees of freedom, Diffusion flames, Green function, Kinetic equations, Mathematical models, Navier-stokes equation, Probability density functions, Two dimensional flow.

For abstract, see STAR 1322

N75-31853/5GA PC$4.25/MF$2.25
Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
Application of Atomic-Absorption Spectroscopy in Physics Research.
B. V. Lvov. 1975, 72p NRC/CNR-TT-1810
Tran-Transl. Into English from J. Quant. Spectr. Radiative Transfer (London), V. 12, No. 4, 1972 p 651-681. Conf-Presented at the 3D Intern. Congr. On Atomic Absorption Spectroscopy, Paris, Sep. 1971.

Descriptors: *Absorption spectroscopy, *Atomic spectra, *Voigt effect, Emission spectra, Numerical analysis, Temperature distribution.
Identifiers: Translations.

For abstract, see STAR 1322

PB-245 079/9GA PC$3.75/MF$2.25
Boston Coll., Chestnut Hill, Mass. Dept. of Chemistry.
Immobilized Enzymes on Electrochemically Conducting Carriers.
Final rept. 1 May 72-31 Oct 74,
J. R. Driscoll, and A. C. Makrides. 1974, 31p
NSF/RA/T-74-014
Grant NSF-GI-34224

Descriptors: *Trypsin, *Carbon, pH, Electrochemistry, Substrates, Ionic mobility, Cations, Kinetics, Chemical bonds, Enzymes.
Identifiers: *Immobilized enzymes, Enzyme activity.

Trypsin was immobilized by covalent bonding to two forms of carbon, a high surface area (230 sq m/g) furnace carbon black and a low surface area (400 sq cm/g) vitreous carbon powder. The activity-pH profile for immobilized trypsin, using N(2)-benzoyl arginine ethyl ester (BAEE) as substrate, is shifted relative to soluble trypsin by about one pH unit. The activity-pH profile for immobilized trypsin suggests a range of ionization constants for the histidine residue at the active site rather than the single value found with soluble trypsin. Ionic strength, nature of the cation, and electrochemical potential of the carbon support, have little effect on the activity-pH profile of immobilized trypsin.

7E. Radio and Radiation Chemistry

COM-75-50600/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Absorbed Dose Distribution in a Pulse Radiolysis Optical Cell.
Final rept.,
Arne Miller, and William L. McLaughlin. 1975, 6p
Sponsored in part by Danish Atomic Energy Commission, Roskilde. Accelerator Section.
Pub. in International Jnl. for Radiation Physics and Chemistry, v7 n5 p661-666 1975.

Descriptors: *Electron bombardment, *Radiolysis, Radiometry, Dose rate.
Identifiers: Reprints.

When a liquid solution in an optical cell is irradiated by an intense pulsed electron beam, it may be important in the chemical analysis of the solution to know the distribution of energy deposited throughout the cell. For the present work, absorbed dose distributions were measured by thin radiochromic dye film dosimeters placed at various depths in a quartz glass pulse radiolysis cell. The cell was irradiated with 30 ns pulses from a field-emission electron accelerator having a broad spectrum with a maximum energy of 2 MeV. The measured three-dimensional dose distributions showed sharp gradients in dose at the largest penetration depths in the cell and at the extreme lateral edges of the cell interior near the optical windows. This method of measurement was convenient because of the high spatial resolution capability of the detector and the linearity and absence of dose-rate dependence of its response.

COM-75-50604/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Radiation-Induced Polymerization of Tetrafluoroethylene and 1,2,3,4,5-Pentafluorostyrene at High Pressure.
Final rept.,
Daniel W. Brown, and Robert E. Lowry. Jul 75, 13p
Pub. in Jnl. of Polymer Science, Polymer Chemistry Edition, v13 n7 p1677-1689 Jul 75.

Descriptors: *Tetrafluoroethylene resins, *Polystyrene, *Copolymerization, Halocarbon resins, High pressure.
Identifiers: Reprints, *Radiation polymerization, *Fluorinated polymers, Chemical reactivity.

Tetrafluoroethylene (A) and 1,2,3,4,5 pentafluorostyrene (B) were irradiated at 15C at autogenous pressure using 30-92 mol% A and at 5000 atm using 42-99.9 mol% A. The high pressure results indicate that r(A), the reactivity ratio for monomer addition to A ended radicals, is 0.005; r(B), the other reactivity ratio, appears to vary from 15 to 60 generally increasing with the A content of the charge. Activity coefficients were measured at autogenous pressure and used in an attempt to correct r(B) for the nonideality of solution. Improved agreement between theoretical and observed compositions resulted, but significant discrepancies remained unexplained. Rate data agreed well with those calculated from a theoretical copolymer rate equation.

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A016 573/8GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
Subtidal Concrete Piling Fauna in Monterey Harbor, California.
Master's thesis,
Winfield Donat, III. Sep 75, 85p

Descriptors: *Fouling organisms, *Pile structures, Sampling, Abundance, Identification, Aquatic animals, Concrete, Tables(Data), Salinity, Temperature, Classification, Theses, California.
Identifiers: Monterey Harbor.

Piling organisms were scraped off one side of a concrete piling from the bottom to the low intertidal zone beneath Municipal Wharf No. 2 in Monterey Harbor, California. Sampling was performed at 0.5 sq m surface area increments. Wet biomass measurements were taken, the organisms were identified and an evaluation of species abundance in each sample was made. Data are given by a Table of Species with abundance in each sample, a Species List with comments on particular organisms, drawings representing the more prominent animals observed and in situ photographs of various piling animals.

AD-A016 717/1GA PC$3.75/MF$2.25
National Academy of Sciences Washington D C
Biological Oceanography: Some Critical Issues, Problems, and Recommendations.
1975, 36p
Contract N00014-75-C-0859
Library of Congress Catalog Card No. 75-15246.

Descriptors: *Marine biology, Aquatic organisms, Distribution, Ecology.
Identifiers: Animal migrations, Animal behavior.

Contents:
What organisms live in the sea and how they are distributed in time and space;
Factors that control the distribution patterns of marine organisms;
How do marine organisms survive;
Biological oceanography, the public mind, and institutional policies.

N75-31698/4GA PC$4.75/MF$2.25
Kiel Univ. (West Germany).
Production of Maritime Organisms under Natural Conditions and in Cultures die Produktion Mariner Organismen Unter Natuerlichen Bedingungen und in Kulturen.
P. H. Koske, J. Lenz, W. Nellen, and B. Zeitzschel. Apr 75, 99p BMFT-FB-M-75-01
Subm-Sponsored by Bundesmin. Fuer Forsch. U. Technol.
In German; English Summary.

Descriptors: *Cultivation, *Earth resources, *Plankton, Coastal ecology, Ecosystems, Fishes, Marine biology, Tolerances (Physiology), Water pollution.

For abstract, see STAR 1322

PB-245 419/7GA PC$4.25/MF$2.25
California Univ., San Diego, La Jolla. Inst. of Marine Resources.
Coastal Upwelling Ecosystems Analysis. Summary of Existing Information on Nekton of Spanish Sahara and Adjacent Regions, Northwest Africa.
Technical rept.,
Maurice Blackburn. Feb 75, 54p IMR-TR-8
NSF/IDOE-75-52
Grant NSF-GX-33502

Descriptors: *Nekton, *Aquatic animals, *Ecology, *North Atlantic Ocean, Coasts, Aquatic biology, Fishes, Crustacea, Fishing grounds, Cephalopoda, Mammals, Upwelling.
Identifiers: International Decade of Ocean Exploration, Ecosystems, Northwest Region(Africa).

The report is a brief summary of written information on the principal species and groups of nekton of Northwest African coastal waters, especially off southern Spanish Sahara. The three main groups of nekton that were recognized were: (1) Fish and cephalopods; (2) crustaceans; and (3) mammals; of which (2) is unimportant in the area of interest, and (3) is very little known. (No data was found on marine reptiles) It was prepared in order to assist U.S. investigators on nekton and related subjects in the Coastal Upwelling Ecosystems Analysis (CUEA) group, in interpreting their data from cruise JOINT-I. The cruise took place during February, March, April and May, 1974, in coastal waters broadly between 21 and 22 degrees N. latitude.

8B. Cartography

E75-10403 PC$3.75/MF$2.25
Technische Universitaet, Clausthal-Zellerfeld (West Germany).
Mapping of Lithologic and Structural Units Using Multispectral Imagery.
Final rept. no. 3, Aug 73-Mar 74,
Peter Kronberg. Apr 74, 31p NASA-CR-143396
Presented at German Geological Society Meeting held on Oct 73, and ESRO Symposium on European Earth Resources Experiments held at Frascati, Italy on Feb 74, and International Afar Symposium held at Bad Bergzabern, West Germany on Apr 74.

Descriptors: Ethiopia, Saudi Arabia, Geological faults, African rift system, Yemen, Gulfs, Tectonics, Plateaus, Volcanology, Somalia, EREP, Skylab program, Maps, Lithology, Multispectral photography.

The author has identified the following significant results. ERTS-1 MSS imagery covering the Afar-Triangle/Ethiopia and adjacent regions (Ethiopian Plateau, Somali Plateau, and parts of Yemen and Saudi Arabia) was applied to the mapping of lithologic and structural units of the test area at a scale 1:1,000,000. Results of the geological evaluation of the ERTS-1 imagery of the Afar have proven the usefulness of this type of satellite data for regional geological mapping. Evaluation of the ERTS images also resulted in new aspects of the structural setting and tectonic development of the Afar--Triangle, where three large rift systems, the oceanic rifts of the Red Sea and Gulf of Aden and the continental East African rift system, seem to meet each other. Surface structures mapped by ERTS do not indicate that the oceanic rift of the Gulf of Aden (Sheba Ridge) continues into the area of continental crust west of the Gulf of Tadjura. ERTS data show that the Wonji fault belt of the African rift system does not enter or cut through the central Afar. The Aysha-Horst is not a Horst but an autochthonous spur of the Somali Plateau.

E75-10413 PC$5.25/MF$2.25
National Ocean Survey, Rockville, Md.
Analytic Aerotriangulation Utilizing Skylab Earth Terrain Camera (S-190B) Photography.
Final rept.,
Morton Keller. Jul 75, 105p NASA-CR-144387
NASA Order T-4110-B

Descriptors: Triangulation, North Carolina, Virginia, Rivers, Multispectral band cameras, EREP, Skylab program, Mapping, Computer programs.

The author has identified the following significant results. Inherent errors in using nonmetric Skylab photography and office-identified photo control made it necessary to perform numerous block adjustment solutions involving different combinations, of control and weight. The final block adjustment was executed holding to 14 of the office-identified photo control points. Solution accuracy was evaluated by comparing the analytically computed ground positions of the 15 withheld photo control points with their known ground positions and also by determining the standard errors of these points from variance values. A horizontal position RMS error of 15 meters was attained. The maximum observed error in position at a control point was 25 meters.

E75-10415 PC$6.25/MF$2.25
Bundesanstalt fuer Bodenforschung, Hanover (West Germany).
Multidisciplinary Geoscientific Experiments in Central Europe.
Rept. no. 2 (Final); Oct 72-Sep 74,
Dieter Bannert. Sep 74, 172p NASA-CR-143412
Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Europe, Geology, Coasts, Geodesy, Tectonics, Soil science, Minerals, Vegetation, Bedrock, Germany, Alps Mountains(Europe), Denmark, EREP, Skylab program, Maps, Data processing.

The author has identified the following significant results. Studies were carried out in the fields of geology-pedology, coastal dynamics, geodesy-cartography, geography, and data processing. In geology-pedology, a comparison of ERTS image studies with extensive ground data led to a better understanding of the relationship between vegetation, soil, bedrock, and other geologic features. Findings in linear tectonics gave better insight in orogeny and ore deposit development for prospecting. Coastal studies proved the value of ERTS images for the updating of nautical charts, as well as small scale topographic maps. A plotter for large scale high speed image generation from CCT was developed.

E75-10416 PC$9.25/MF$2.25
Oregon State Univ., Corvallis.
The Comparative Evaluation of ERTS-1 Imagery for Resource Inventory in Land Use Planning.
Final rept. Jul 72-Jan 74,
Barry J. Schrumpf, G. H. Simonson, D. P. Paine, R. D. Lawrence, and W. T. Pyott. Oct 74, 321p NASA-CR-143406
Contract NAS5-21831
Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Land use, Vegetation, Timber inventory, Geology, Soils, Oregon, Parks, Earth resources program, Digital systems, Plotting, Multispectral band scanners.

The author has identified the following significant results. Multidiscipline team interpretation and mapping of resources for Crook County is complete on 1:250,000 scale enlargements of ERTS imagery and 1:120,000 hi-flight photography. Maps of geology, soils, vegetation-land use and land resource units were interpreted to show limitations, suitabilities, and geologic hazards for land use planning. Mapping of lineaments and structures from ERTS imagery has shown a number of features not previously mapped in Oregon. A multistage timber inventory of Ochoco National Forest was made, using ERTS images as the first stage. Inventory of forest clear-cutting practices was successfully demonstrated with color composites. Soil tonal differences in fallow fields correspond with major soil boundaries in loess-mantled terrain. A digital classification system used for discriminating natural vegetation and geologic material classes was successful in separating most major classes around Newberry Caldera, Mt. Washington, and Big Summit Prairie.

E75-10418 PC$6.25/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Application of Earth Resources Technology Satellite Data to Urban and Regional Planning: Test Site, County of Los Angeles.
Final rept. 30 Jun 72-30 Jun 74,
S. Raje, J. McKnight, G. Willoughby, and R. Economy. 2 Dec 74, 164p 74SD-4265 NASA-CR-143408
Contract NAS5-21797
Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Southern California, Regional planning, Mountains, Geological faults, Cities, Ground truth, Earth resource program, Photo interpretation, Information systems.

The author has identified the following significant results. The County of Los Angeles photointerpreted ERTS film products to define problems of interest, coordinated ground truth over the complex test site including interfaces with secondary users as well as participated in on-line analyses of the GE multispectral information extraction systems. Interactive machine analyses were carried out, developing techniques and procedures as well as evaluating the outputs for community and regional planning. Extensive aircraft underflight coverage was provided that was valuable both in inputs preparation and outputs evaluation of the machine-aided analyses. One of the nonstandard ERTS images led to the discovery of a major new fault lineament on the northern slope of the Santa Monica Mountains.

E75-10423 PC$4.25/MF$2.25
International Inst. for Aerial Survey and Earth Sciences, Enschede (Netherlands).
Evaluation of EREP Techniques for Geological Mapping.
Final rept. Aug 74-Aug 75,
H. E. C. Vandermeermohr, and G. S. Srivastava. Aug 75, 68p NASA-CR-143411
Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Geology, Mapping, Rocks, Rivers, Alluvium, Regional planning, Sedimentary rocks, Geological faults, Spain, Structural basins, Pyrenees Mountains(Europe) EREP, Skylab program, Photointerpretation, Multispectral band cameras.

The author has identified the following significant results. Skylab photographs may be successfully used for preparing a reconnaissance geological map in the areas where no maps or semi-detail maps exist. Large coverage of area and regional perspective from Skylab photographs can help better coordination in regional mapping. It is possible to delineate major structural trends and other features like mega-lineaments, geofractures, and faults, which have evaded their detection by conventional methods. The photointerpretability is better in areas dominated by sedimentary rocks. Rock units of smaller extent and having poor geomorphic expressions are difficult to map. Demarcation of quaternary river alluvium can be made with better precision and ease with the Skylab photographs. Skylab photographs are not good for preparing geological maps larger than 1:270,000 scale.

N75-31553/1GA PC$4.25/MF$2.25
Arizona Univ., Tucson. Office of Arid Lands Studies.
Applied Remote Sensing Program (Arsp) to State and Local Government.
Annual Report.
J. D. Johnson, K. E. Foster, D. A. Mouat, and R. Clark. Aug 75, 66p NASA-CR-143456, OALS-BULL-10
Contract NGL-03-002-313

Descriptors: *Environmental surveys, *Governments, *Landsat satellites, *Remote sensors, Arizona, Geological surveys, Land management, Resources management, Soil mapping, Vegetation.

For abstract, see STAR 1322

N75-31557/2GA PC$7.00/MF$2.25
National Aeronautics and Space Administration. Wallops Station, Wallops Island, Va.
Geos-C Ground Truth Program Description Document.
L. R. Goodman. Mar 75, 196p NASA-TM-X-69359

Descriptors: *Geos-c satellite, *Ground truth, *Project planning, Calibrating, Radio altimeters, Sea states.

For abstract, see STAR 1322

N75-31938/4GA PC$3.25/MF$2.25
Caspan Corp., Houston, Tex. Engineers and Constructors.
Remote Sensing for Land Use Analysis.
Final Report.
Jun 75, 18p NASA-CR-144392
Contract NAS9-12698

Descriptors: *Data processing, *Land use, *Management information systems, *Remote sensors, Data management, Landsat satellites, Mapping, Skylab 4.

For abstract, see STAR 1322

8C. Dynamic Oceanography

AD-A016 291/7GA PC$3.75/MF$2.25
Lamont-Doherty Geological Observatory Palisades N Y
Profiles of Transport, Current and Temperature in the MODE Areas of the North Atlantic.
Technical rept. Sep 71-Jul 75,
T. E. Pochapsky, and F. D. Malone. Jul 75, 42p
Rept nos. TR-2, TR-I
Contract N00014-67-A-0108-0011, Grant NSF-GX-30987

Descriptors: *Ocean currents, *Oceanographic data, *North Atlantic Ocean, Profiles, Temperature gradients, Echo ranging, Depth, Thermoclines, Floats, Transponders, Telemetering data, Graphs.
Identifiers: International Decade of Ocean Exploration.

Measurements of the transport and temperature as a function of depth were obtained at two locations in the North Atlantic during the MODE experiments of the IDOE. Vertical profiles of the current as well as hodographs were determined from these. Acoustic ranging was used for the flow measurements based on techniques developed in the instrumented float program on the senior author. The results of these measurements are presented in graphical form for experiments at 28 degrees N, 68.7 degrees W during a 4-day operation in 1972 and at 27.9 degrees N. 69.7 degrees W for a 11-day sequence in 1973. Profiling drops are described individually along with experimental or analytical factors affecting specific profiles. This report is a distillation of the measurements only and avoids interpretations of their significance.

AD-A016 318/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Dept of Meteorology
A Numerical Investigation of a Laboratory Analogy of the Wind-Driven Ocean Circulation,
Robert C. Beardsley. 1972, 15p Rept no. 75-4
Contract N00014-67-A-0204-0048
Availability: Pub. in Proceedings of Symposium on Numerical Models of Ocean Circulation, Naval Air Station, Durham, N. H., Oct 72 p311-324.

Descriptors: *Ocean models, *Wind, *Air water interactions, Circulation, Rossby waves, Equations of motion, Mathematical models, Finite difference theory, Two dimensional flow, Atmospheric circulation, Marine geophysics, Friction, Ocean surface, Vortices, Viscosity, Sea water, Ocean currents, Reprints.
Identifiers: *Ocean circulation, Ekman layers.

A numerical model is developed and used to simulate the 'sliced-cylinder' laboratory model of the wind-driven ocean circulation. Circular geometry is used and the finite-different analog to Greenspan's (1969) two-dimensional vorticity equation is integrated using the extremely fast implicit scheme developed by Israeli (1970). The numerical model accurately reproduces the flow regimes and Rossby wave instability observed in the laboratory model. (Author)

AD-A016 382/4GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
Kinematics of Surf Zone Breaking Waves: Measurement and Analysis.
Master's thesis,
James Joseph Galvin. Sep 75, 96p

Descriptors: *Ocean waves, *Kinematics, *Beaches, Particles, Surf, Power spectra, Harmonic analysis, Theorems, Chi square test, Probability density functions, Theses, Measurement, California.
Identifiers: *Breaking waves, Del Monte Beach.

Simultaneous measurements of water surface fluctuations and horizontal water particle velocities in a line perpendicular to the direction of wave approach extending across the surf zone were taken in varying surf conditions at two locations. The spectral velocities calculated using linear theory as a transfer function underestimated measured values by 79-86% at the peak of the spectrum. The coherence values were generally low indicating non-linear and turbulent conditions. Strong harmonics in the spectra of the waves and water particle velocities further suggest a non-linear system. The theoretical phases computed using linear theory did not accurately predict the observed phases. In general breaking waves can be characterized as a strongly non-linear wave phenomencn. Measured frequency distributions were compared with both Gaussian and Gram-Charlier distributions by using the chi-square goodness-of-fit test. Qualitatively, the Gram-Charlier distribution gave the better fit to the flow velocity data.

AD-A016 589/4GA PC$3.25/MF$2.25
Woods Hole Oceanographic Institution Mass
Bibliography of Technical Reports - 1974,
Cecelia B. Fuglister. Jan 75, 16p Rept no. WHOI-74-105
See also report dated Jan 74, AD-782 998.

Descriptors: *Oceanographic data, *Bibliographies, Ocean currents, Marine geophysics, Marine geology, Underwater sound, Ocean bottom topography, Marine biology, Sediments.

The bibliography lists all Technical Reports prepared by the Woods Hole Oceanographic Institution in the year 1974. It includes an author index, and also a key relating Reports to 'Contribution Numbers'.

AD-A016 740/3GA PC$3.25/MF$2.25
Texas A and M Univ College Station Dept of Oceanography
Radiative Transfer in the Earth's Atmosphere and Ocean: Influence of Ocean Waves.
Rept. no. 7,
Gilbert N. Plass, George W. Kattawar, and John A. Guinn, Jr. 14 Mar 75, 15p
Contract N00014-68-A-0308-0002
Availability: Pub. in Applied Optics, v14 n8 p1924-1936 Aug 75.

Descriptors: *Air water interactions, *Radiative transfer, Atmosphere models, Radiance, Ocean models, Ocean waves, Ocean surface, Surface roughness, Solar radiation, Photons, Monte Carlo method, Marine geophysics, Rayleigh scattering, Mie scattering, Aerosols, Reflection, Refraction, Absorption, Heat flux, Contrast, Optical properties, Reprints.
Identifiers: Hydrosols.

The radiance in the earth's atmosphere and ocean is calculated for a realistic model including an ocean surface with waves. Individual photons are followed in a Monte Carlo calculation. In the atmosphere, both Rayleigh scattering by the molecules and Mie scattering by the aerosols as well as molecular and aerosol absorption are taken into account. Similarly, in the ocean, both Rayleigh scattering by the water molecules and Mie scattering by the hydrosols as well as absorption by the water molecules and hydrosols are considered. Separate single-scattering functions are used which are calculated separately for the aerosols and the hydrosols from the Mie theory with appropriate and different size distributions in each case. The scattering angles are determined from the appropriate scattering function including the strong forward-scattering peak when there is aerosol or hydrosol scattering. Both the reflected and refracted rays, as well as the rays that undergo total internal reflection, are followed at the ocean surface. Graphs show the influence of the waves on the upward radiance at the top of the atmosphere are just above the ocean surface and on the downward radiance just below the ocean surface as well as deeper within the ocean. The radiance changes are sufficient at the top of the atmosphere to determine the sea state from satellite measurements. Within the ocean the waves smooth out the abrupt transition that occurs at the edge of the allowed cone for radiation entering a calm ocean. The influence of the waves on the contrast between the sky and sea at the horizon is discussed.

AD-A016 749/4GA PC$3.25/MF$2.25
Johns Hopkins Univ Baltimore Md
On the Depth of the Halocline in an Estuary,
Robert R. Long. 4 Feb 75, 6p Rept no. TR-8-Ser-C
Contracts N00014-75-C-0805, N00014-67-A-0163-0013
Availability: Pub. in Jnl. of Physical Oceanography, v5 n3 p551-554 Jul 75.

Descriptors: *Estuaries, Salinity, Gradients, Stratification, Depth, Mixing, Fresh water, Circulation, Turbulence, Laboratory tests, Brackish water, Interfaces, Reprints.
Identifiers: Haloclines, Richardson number.

This note relates the depth of the halocline in an estuary to the fresh water influx using simple and general arguments. It is shown that the depth becomes large for both weak and strong influxes. This result is similar to observations in a laboratory experiment and in the Alberni Inlet. (Author)

AD-A016 794/0GA PC$3.75/MF$2.25
Woods Hole Oceanographic Institution Mass
Cruise Report, KNORR 26,
James E. Gifford. Sep 75, 45p Rept no. WHOI-75-104
Contract N00014-66-C-0241

Descriptors: *Mooring, Oceanographic equipment, Deep oceans, Deep water, Ocean currents, Flowmeters, North Atlantic Ocean.
Identifiers: *Oceanographic expeditions, Knorr vessel.

KNORR 26 was a single-leg cruise of the Woods Hole Oceanographic Institution's Buoy Project, departing Woods Hole May 17 and returning June 8, 1972; 7 moorings were set for the acquisition of scientific data and 10, previously set, were recovered.

AD-A016 849/2GA PC$3.25/MF$2.25
Woods Hole Oceanographic Institution Mass
Cruise Report, ATLANTIS II 66.
Technical rept.,
James E. Gifford. Sep 75, 24p Rept no. WHOI-74-103
Contract N00014-66-C-0241

Descriptors: *Mooring, Oceanographic equipment, Deep oceans, Deep water, Ocean currents, North Atlantic Ocean, Flowmeters.
Identifiers: *Oceanographic expeditions, Atlantis 2 vessel.

Atlantis II Cruise 66 was a single-leg cruise of the Woods Hole Oceanographic Institution's Buoy Project, departing Woods Hole 7 December and returning 21 December 1971. Four moorings were set for the acquisition of scientific data and two, previously set, were recovered.

AD-A016 927/6GA PC$4.50/MF$2.25
David W Taylor Naval Ship Research and Development Center Bethesda Md Central Instrumentation Dept
Buoy Motion Measurement System.
Evaluation rept. Jun 73-Sep 75,
David T. Milne, Paul M. Haldeman, and Barry L. Zimmerman. Jun 73, 82p Rept no. CID-29-2 Supersedes AD-780 108.

Descriptors: *Sea states, *Remote detectors, Buoys, Motion, Telemeter systems, Construction, Drawings, Photographs.
Identifiers: Design, Blue prints.

A buoy motion measurement system is described which measures, telemeters and records, on command, buoy roll, pitch, heave, battery voltage and mooring cable tension of up to seven buoys deployed near a light tower. The system also measures and records sea state at the tower.

COM-75-11391/0GA PC$7.25/MF$2.25
National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
STD, Current Meter, and Drogue Observations in Rosario Strait, January - March 1974.
Technical rept.,
James D. Schumacher, and R. M. Reynolds. Jun 75, 224p NOAA-TR-ERL-333, PMEL-24 NOAA-75091804

Descriptors: *Ocean currents, *Oceanographic data, *Rosario Strait, Oceanographic surveys, Towed bodies, Ocean temperature, Salinity, Ocean tides, Depth, Power spectra, Time series analysis, Air water interactions, Flowmeters, Puget Sound.

Summaries of STD measurements, current meter and drogue data from Rosario Strait and adjacent waters during January to March 1974 are presented as computer-generated plots and as contours of temperature, salinity, and sigma-t. Some tidal and wind data has been included to aid in data interpretation.

COM-75-11421/5GA PC$8.50/MF$2.25
National Ocean Survey, Rockville, Md.
Tidal Current Tables 1976. Pacific Coast of North America and Asia.
1975, 259p* NOAA-75092504

Descriptors: *Ocean tides, *Tidal currents, *Pacific Coasts(North America), *Pacific Coast(Asia), Ocean waves, Sea level, Water flow, Oceanographic data, Circulation, Tables(Data), Predictions, Diurnal variations.

The report includes the Tidal Current Tables for the Pacific Coast of North America and Asia for 1976. There are four separate Tables in this report: Table 1 is the Daily current predictions, Table 2 is the Current differences and other constants, Table 3 is the Velocity of current at any time, and Table 4 is the Duration of slack. Also included are the Coastal tidal currents, Wind driven currents, The combination of currents, and Publications by the National Ocean Survey relating to tides and tidal currents.

COM-75-11429/8GA PC$6.25/MF$2.25
Hawaii Univ., Honolulu. James K. K. Look Lab. of Oceanographic Engineering.
Wave Transformations Over a Sloping Bottom and Over a Three-Dimensional Shoal.
Miscellaneous rept. no. 11,
James Richard Walker. May 74, 156p Look Lab-75-11, UNIHI-SEAGRANT-CR-75-03 NOAA-75100205

Descriptors: *Water waves, Refraction, Wave forecasting, Ocean waves, Shallow water, Water flow, Height, Decay, Phase velocity, Hydraulic models, Theses.
Identifiers: *Shoals, Sea Grant program.

The effect of wave height and wave breaking on wave refraction over a three-dimensional shoal is discussed. A hydraulic model was constructed to study the phenomena. The model study was conducted in two phases. First, wave transformations over a constant bottom slope propagating from intermediate water depths through the breaking zone in shallow water depths were studied. In this series of tests, the wave-height growth, decay, and phase velocities were studied. The second series of tests was conducted to ascertain the refraction patterns over a three-dimensional shoal. Measured refraction patterns and coefficients were compared with refraction patterns predicted by conventional refraction analysis techniques which use Airy wave theory.

NTIS/PS-75/810/2GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Tsunamis (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Guy E. Habercom, Jr. Nov 75, 148p*

Descriptors: *Bibliographies, *Tsunamis, Ocean waves, Earthquakes, Coasts, Seismic detection, Warning systems, Seismic waves, Abstracts, Gravity waves.

Predictions, effects, and protective measures relative to tsunamis are reviewed in these Government-sponsored research reports. Harbors, river basins, and coastal areas are among the areas investigated. (Contains 143 abstracts)

PB-245 417/1GA PC$4.25/MF$2.25
Washington Univ., Seattle. Dept. of Oceanography.
Coastal Upwelling Ecosystems Analysis. Technical Report 5. Drogue Measurements and Related Hydrography. August 7-11 and August 23-26, 1972. (CUE-1),
Merritt Stevenson, Richard Garvine, and Bruce Wyatt. Feb 74, 66p Ref-M74-9 NSF/IDOE-75-49
Prepared in cooperation with Inter-American Tropical Tuna Commission, La Jolla, Calif., Connecticut Univ., Groton. Marine Sciences Inst., Oregon State Univ., Corvallis. School of Oceanography.

Descriptors: *Oceanographic surveys, *Oceanographic data, *North Pacific Ocean, Ocean currents, Towed bodies, Ocean temperature, Salinity, Wind direction, Wind velocity, Measurement, Upwelling, Coasts.
Identifiers: International Decade of Ocean Exploration, Ecosystems.

The report is a presentation of observations from two cruises in which horizontal current measurements were made with parachute and vane drogues in a zone adjacent to a frontal boundary monitored by STD observations. The methods and procedures used at sea and in the laboratory to process the measurements are reviewed. The data are divided into hydrographic and drogue measurements and are presented in both graphic and tabular formats. The report is in both English and Spanish text.

PB-245 418/9GA PC$7.00/MF$2.25
Washington Univ., Seattle. Dept. of Oceanography.
Coastal Upwelling Ecosystems Analysis. Technical Report 6. A Compilation of Wind, Current, and Temperature Measurements: Oregon, July and August, 1973,
David Halpern, James R. Holbrook, and R. Michael Reynolds. Sep 74, 184p Ref-M74-73 NSF/IDOE-75-50

Descriptors: *Ocean currents, *Oceanographic data, *North Pacific Ocean, Coasts, Wind velocity, Ocean temperature, Wind direction, Solar radiation, Time series analysis, Diagrams, Buoys, Power spectra, Salinity, Chlorophylls, Oceanographic surveys, Oregon.
Identifiers: International Decade of Ocean Exploration, Thomas G. Thompson Vessel, Cayuse vessel, Yaquina vessel, Ecosystems.

Summaries of wind recorder, current meter and temperature measurements obtained from instrumented surface mooring systems installed in the coastal and offshore waters near Sand Lake, Oregon, are presented in computer-generated output as standard statistics, histograms (speed and direction), time series plots (speed, direction, east and north components), progressive vector diagrams and spectra (east, north, kinetic energy and rotary).

PB-245 421/3GA PC$7.00/MF$2.25
Rosenstiel School of Marine and Atmospheric Science, Miami, Fla.
Coastal Upwelling Experiment - II. Profiling Current Meter Data Report R/V YAQUINA Cruises Y7307-3, Y7307-D, and Y7308-A (15-18 July, 29 July-06 August, and 16-20 August, 1973),
Thomas B. Curgin, and Christopher N. K. Mooers. May 75, 188p UM-RSMAS-75022 NSF/IDOE-75-47
Grant NSF-GX-31264
See also PB-235 933.

Descriptors: *Ocean currents, *Upwelling, *Oceanographic data, *North Pacific Ocean, Oceanographic surveys, Ocean temperature, Salinity, Oceanographic charts, Flowmeters, Oceanographic ships, Coasts, Tables(Data), Oregon.
Identifiers: International Decade of Ocean Exploration, Yaquina Vessel.

The report includes data from 3 cruises of the R/V YAQUINA during the summer of 1973. The purpose of these cruises was to make detailed hydrographic and current profiles in a coastal upwelling frontal zone. High resolution (both horizontal and vertical) cross sections, alongshore mapping patterns, fixed location time series, small-scale cross sections, and drogue tracking were all used in the effort to examine the details of the frontal zone. Several instruments, used in various combinations and at different times, supplied the core of each station's data. A general description of the profiling current meter technique is given. Together these instruments provide temperature, conductivity, salinity, current speed, and current direction as functions of pressure at each station. This report contains all of the PCM data obtained during the experiments.

PB-245 660/6GA Not available NTIS
National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Oceanographic Labs.
Variations in the Density Field During Coastal Upwelling,
David Halpern. 1974, 13p NSF/IDOE-75-29
Grant NSF-AG-299
Pub. in TETHYS, v6(1-2) p363-374 1974.

Descriptors: *Ocean waves, *Upwelling, *Oceanographic data, *Coasts, Geostropic wind, Density(Mass/volume), Wind velocity, Salinity, Wind direction, Ocean temperature, Ocean currents, Atmospheric circulation, Ocean surface, Oregon, North Pacific Ocean.
Identifiers: Reprints, International Decade of Ocean Exploration.

On three separate occasions during July and August 1972 the wind directions measured at Newport, Oregon were steady and from the north for intervals greater than an inertial period. Temporal and spatial variations of STD measurements show that during each of these episodes the response of the upper ocean was similar to that predicted by the Ekman-Thorade model of coastal upwelling. Typical scales of

motion during a coastal upwelling event were: vertical velocity in a 6 km band located within 10 km of the coast was about 0.01 cm/sec; horizontal offshore velocity between the surface and 20 meters was about 5 cm/sec. A baroclinic tilt of the sea surface and a southward geostrophic flow were generated by the surfacing of subsurface water. The offshore flow of the upwelled water decreased the static stability of the water facilitating vertical mixing between the onshore flows.

PB-245 663/0GA Not available NTIS
Oregon State Univ., Corvallis. School of Oceanography.
Programme for International Southern Ocean Studies,
Victor T. Neal. 1974, 2p NSF/IDOE-75-23
Pub. in Polar Record, v17 n108 p348-349 1974.

Descriptors: *Oceanographic surveys, Ocean currents, Ocean temperature, Climate, Monitoring, Sea ice, Circulation, Research projects, Arctic Ocean, Scotia Sea, Ross Sea, Weddell Sea, Indian Ocean, South Pacific Ocean.
Identifiers: Reprints, International Decade of Ocean Exploration, International Southern Ocean Studies.

The one-page article tells of a long-term research programme in the Southern Ocean called the International Southern Ocean Studies (ISOS). Sponsored by NSF as part of the US contribution to International Decade of Ocean Exploration (IDOE), this programme will consist of a coordinated sequence of ocean dynamics and monitoring experiments, with a major long-term goal of determining the relationship of circumpolar dynamics to global ocean circulation and its possible role in world weather and climate.

PB-245 700/0GA Not available NTIS
National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Oceanographic Labs.
Instruments and Methods. An Intercomparison of Three Current Meters Operated in Shallow Water,
David Halpern, R. Dale Pillsbury, and Robert L. Smith. 1974, 11p NSF/IDOE-75-24
Grants NSF-GX-28746, NSF-GX-33502
Prepared in cooperation with Oregon State Univ., Corvallis, School of Oceanography. Sponsored in part by Office of Naval Research, Arlington, Va.
Pub. in Deep-Sea Research v21 p489-497 1974.

Descriptors: *Ocean currents, *Flowmeters, North Pacific Ocean, Continental shelves, Shallow water, Kinetic energy, Measuring instruments, Instrument characteristics, Comparison.
Identifiers: Reprints, International Decade of Ocean Exploration.

A current meter intercomparison was made during a multi-institutional coastal upwelling experiment (CUE-I) in July and August, 1972. Three types of recording current meters were moored on the Oregon continental shelf: AMF vector-averaging current meters (VACM) and Geodyne Model A-850-2 current meters were used in a taut mooring with a surface buoy, and Aanderaa Model 4 current meters (RCM 4) were suspended in arrays from subsurface floats. For the experiment, a subsurface mooring with four Aanderaa current meters was installed within 0.5 km of the surface mooring from which the Geodyne and AMF current meters were suspended in 100m of water at 44 deg 45 min N, 124 deg 17 min W, about 18.5 km from the Oregon coast. The measurements from the three current meters having most nearly a common depth (an AMF at 16m, a Geodyne at 19m, and an Aanderaa at 20m) for a 25-day period beginning on 20 July 1972 are compared.

8D. Geochemistry

AD-A016 730/4GA PC$3.25/MF$2.25
Lehigh Univ Bethlehem Pa Center for Marine and Environmental Studies
Effects of Sample Handling on the Composition of Marine Sedimentary Pore Water,
Matthew H. Hulbert, and Mark P. Brindle. 23 Jan 74, 3p
Contract N00014-67-A-0370-005, Grant NSF-GA-37079
Availability: Pub. in Geological Society of America Bulletin, v86 n1 p109-110 Jan 75.

Descriptors: *Sea water, Sediments, Interstitial, Abyssal zones, Cations, Geochemistry, Concentration(Chemistry), Variations, Storage, Samplers, Reprints.
Identifiers: Pore water.

Three sediment samples from the Gulf of Mexico abyssal plain were subjected to five representative handling and storage procedures before the pore water was expressed and analyzed for Na(+), K(+), Mg(2+), and Ca(2+). The observed alterations in major cation concentrations during storage did not appear to be entirely related to temperature. Samples stored at in situ temperatures unexpectedly displayed greater changes than those which were stored at room temperature and subsequently rechilled. (Author)

8E. Geodesy

AD-A016 366/7GA PC$4.25/MF$2.25
International Centre for Earth Tides Brussels (Belgium)
Trans World Tidal Gravity Profile.
Final rept. 1 Jun 73-30 Jun 75,
P. Melchior, and B. Ducarme. 1 Sep 75, 57p
AFCRL-TR-75-0499
Grant AF-AFOSR-2557-73

Descriptors: *Gravity anomalies, *Gravimetric analysis, *Gravimetry, Profiles, Tables(Data), Statistical data, Asia, Australia, Phase measurement, Calibration, Instrumentation, Belgium.
Identifiers: *Earth tides, Gravimeters.

This report discusses the theoretical aspects of a fundamental earth tide measuring station; operational aspects of trans world tidal gravity profiles results obtained in nine Asiatic stations, data recorded in Australia.

AD-A016 491/3GA PC$3.75/MF$2.25
Ohio State Univ Columbus Dept of Geodetic Science
External Gravity Potential of the Earth, Gravimetric Quantities and Geodetic Parameters Affected by Gravity.
Final rept. 1 Jan 72-30 Jun 75,
Urho A. Uotila. Aug 75, 45p Rept no. DGS-229
AFCRL-TR-75-0431
Contract F19628-72-C-0120

Descriptors: *Gravity anomalies, *Geodesy, Gravimetry, Matrices(Mathematics), Gradients, Geoids, Least squares method, Reviews, Geopotential.
Identifiers: *Gravimetric geodesy, Matrix inversion, Gollocation method.

Subject matter includes such items as the use of gravity gradient measurements, the convergence problems in physical geodesy, least-squares collocation theory and applications, combination of satellite and gravimetry data, inversion of large symmetric matrices, covariance functions, anomaly degree variances, mass distribution in the earth's interior, role of altimeter data in the determination of mean gravity anomalies, refinement of modeling techniques for the determination of geopotential coefficients and computational techniques in gravimetry. Suggestions for further studies are made.

AD-A016 526/6GA PC$3.25/MF$2.25
Ohio State Univ Columbus Dept of Geodetic Science
Comparison of Upward Continued Anomalies Computed by the Poisson Integral and by Collocation.
Scientific interim rept.,
Richard H. Rapp, and Sammy I. Agajelu. Jun 75, 17p Rept nos. DGS-227, Scientific-26 AFCRL-TR-75-0401
Contract F19628-72-C-0120

Descriptors: *Geodesy, Gravity anomalies, Statistical analysis, Least squares method, Computer applications.
Identifiers: Collocation method, Poisson equation, *Gravimetric geodesy.

The computation of gravity anomalies at four altitudes, 6.096km, 7.010km, 9.144km and 10.670km, was carried out through the use of the standard Poisson integral, and through the use of the method of least squares collocation as implemented through a Fortran computer program written by Tscherning. In the comparison of the results the authors found (approximately) mean differences on the order of 0.5mgal, root mean square differences on the order of 10 percent. Specific values depended on how the collocation procedure was implemented and the heights involved. The computer time needed for the collocation procedure was greater than that needed for the Poisson integral. In cases when an integral formula can be obtained for a desired quantity, the collocation process would take longer computationally. However there are many types of computations that can only be done using least squares collocation.

E75-10421 PC$4.75/MF$2.25
Battelle Columbus Labs., Ohio.
The Application of Skylab Altimetry to Marine Geoid Determination.
Final rept.,
A. G. Mourad, S. Gopalapillai, M. Kuhner, and D. M. Fubara. Jul 75, 94p NASA-CR-144372
Contract NAS9-13276

Descriptors: Geoids, Altimeters, Gravity anomalies, Bathymeters, EREP, Skylab program, Error analysis, Ephemeris time.

The author has identified the following significant results. The major results can be divided broadly into two groups. One group is concerned with the effects of errors inherent in the various input data, such as the orbit ephemeris, a priori geoid etc. The other consists of results of the actual analysis of the data from the Skylab EREP passes 4, 6, 7, and 9. Results from the first group were obtained from the analysis of some preliminary data from EREP pass 9 mode 5. The second group of results consists of a set of recovered bias terms for each of the submodes of observations and a set of nine altimetry geoid profiles corresponding to the various passes and modes. Along with each of these profiles, the priori geoid, gravity anomaly, and the bathymetric data profiles are also presented for easy comparison.

N75-31179/5GA PC$4.75/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Libra: An Inexpensive Geodetic Network Densification System.
H. F. Fliegel, M. Gantsweg, and P. S. Callahan. 15 Aug 75, 98p NASA-CR-143486, JPL-TM-33-725
Contract NAS7-100

Descriptors: *Earthquakes, *Geodetic surveys, *Geophysics, Radio interferometers, Satellite observation.

For abstract, see STAR 1322

8F. Geography

COM-75-11417/3GA PC$4.75/MF$2.25
Hawaii Univ., Honolulu. Sea Grant Program.
Beach Cusps,
Terry Hammerwold. Apr 74, 92p Working paper-11 NOAA-75092503
Grants NOAA-04-3-158-29, NOAA-2-35243

Descriptors: *Beaches, *Coastal topographic features, *Hawaii, Shores, Profiles, Sands, Sediments, Dunes, Sandbars, Slopes, Ocean waves.
Identifiers: Sea Grant program, *Beach cusps.

Existing literature related to the phenomenon of beach cusps is somewhat contradictory. Significant theory and data from literature is presented in this paper and evaluated with regard to field data obtained at several cusped beaches in the Hawaiian Islands. General topographic and sedimentary data on cusps is presented and correlations are made between cusp, beach, and surf parameters. Several existing theories concerning cusp formation, migration, and correlations are found to disagree with new data. Theoretical cusp wave lengths calculated from edge wave-related theory are found to agree with observed cusp wave lengths for various conditions. The engineering significance of beach cusps is discussed.

N75-31544/0GA PC$11.25/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era. Volume 1: Earth Resources Program Scope and Information Needs.
Nov 74, 443p NASA-CR-141767
Contract NAS9-13401

Descriptors: *Earth resources program, *Management information systems, *Resources management, *Space shuttles, Systems engineering, Technology utilization, User requirements.

For abstract, see STAR 1322

N75-31545/7GA PC$7.50/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era. Volume 2: An Assessment of the Current State-of-the-ART.
Oct 74, 239p NASA-CR-141768
Contract NAS9-13401

Descriptors: *Earth resources program, *Management information systems, *Resources management, *Space shuttles, Earth resources, Systems engineering, Technology utilization, User requirements.

For abstract, see STAR 1322

N75-31546/5GA PC$8.50/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era. Volume 3: Mission and System Requirements for the Total Earth Resources System.
Nov 74, 258p NASA-CR-141769
Contract NAS9-13401

Descriptors: *Earth resources program, *Management information systems, *Mission planning, *Space shuttles, *Systems engineering, Earth resources, Resources management, Technology utilization, User requirements.

For abstract, see STAR 1322

N75-31547/3GA PC$5.75/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era. Volume 4: The Role of the Shuttle in the Earth Resources Program.
Nov 74, 134p NASA-CR-141770
Contract NAS9-13401

Descriptors: *Earth resources program, *Management information systems, *Space shuttles, Earth resources, Resources management, Systems engineering, Technology utilization, User requirements.

For abstract, see STAR 1322

N75-31548/1GA PC$9.25/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era. Volume 5: Detailed System Requirements: Two Case Studies.
Nov 74, 310p NASA-CR-141771
Contract NAS9-13401

Descriptors: *Earth resources program, *Management information systems, *Resources management, *Space shuttles, *Systems engineering, Crop growth, Earth resources, Land management, Mission planning, Technology utilization, User requirements.

For abstract, see STAR 1322

N75-31549/9GA PC$4.25/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era. Volume 6: An Early Shuttle Pallet Concept for the Earth Resources Program.
Nov 74, 70p NASA-CR-141772
Contract NAS9-13401

Descriptors: *Earth resources program, *Management information systems, *Mission planning, *Resources management, *Space shuttles, Census, Cities, Earth resources, Land use, Systems engineering, Technology utilization, User requirements.

For abstract, see STAR 1322

N75-31550/7GA PC$4.75/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era. Volume 7: User Models: A System Assessment.
Oct 74, 91p NASA-CR-141773
Contract NAS9-13401

Descriptors: *Earth resources program, *Management information systems, *Space shuttles, *Systems engineering, *User requirements, Earth resources, Management methods, Mathematical models, Resources management, Technology utilization.

For abstract, see STAR 1322

N75-31551/5GA PC$9.25/MF$2.25
General Electric Co., Philadelphia, Pa. Space Div.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era. Volume 8: User'S Mission and System Requirements Data (Appendix a of Volume 3).
Oct 74, 303p NASA-CR-141774
Contract NAS9-13401

Descriptors: *Earth resources program, *Management information systems, *Resources management, *Space shuttles, *User requirements, Data bases, Earth resources, Systems engineering, Technology utilization.

For abstract, see STAR 1322

N75-31552/3GA PC$3.75/MF$2.25
General Electric Co., Philadelphia, Pa. Advanced NASA Program Office.
Tersse: Definition of the Total Earth Resources System for the Shuttle Era: Executive Summary.
Mar 75, 29p NASA-CR-141766
Contract NAS9-13401
Subm-Prepared in Cooperation with Environ. Res. Inst. Of Mich., Ann Arbor, Mich.

Descriptors: *Earth resources program, *Management information systems, *Resources management, *Space shuttles, Earth resources, Systems engineering, Technology utilization.

For abstract, see STAR 1322

N75-31558/0GA PC$6.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Investigation of Earth Resources by Space Means. Part 1. Methods of Measurement and Processing of Information.
Y. K. Khodarev, and Y. L. Ziman. Sep 75, 174p
NASA-TT-F-16484
Contract NASW-2791
Tran-Transl. Into English from Acad. Of Sci. (Moscow), 1975 164 p.

Descriptors: *Earth resources, *Economic factors, *Remote sensors, *Surveillance, Data processing, Research aircraft.
Identifiers: Translations.

For abstract, see STAR 1322

8G. Geology and Mineralogy

AD-A016 311/3GA PC$3.25/MF$2.25
Scripps Institution of Oceanography San Diego Calif Marine Physical Lab
Near-Bottom Geophysical Study of the Mid-Atlantic Ridge Median Valley Near Lat 37 deg n: Preliminary Observations.
Summary rept.,
Ken Macdonald, Bruce P. Luyendyk, J. D. Mudie, and F. N. Spiess. 3 Dec 74, 10p Rept no. MPL-U-105/74
Contract N00014-69-A-0200-6002, Grant NSF-GA-36818
Availability: Pub. in Geology, p211-215 Apr 75.

Descriptors: *Ocean ridges, *Faults(Geology), *Valleys, Ocean bottom topography, Structural geology, Marine geophysics, Tectonics, North Atlantic Ocean, Magnetic anomalies, Volcanoes, Intrusion, Reprints.
Identifiers: Midatlantic ridge, FAMOUS project, Ocean bottom spreading.

Near-bottom geophysical observations made over the median valley of the Mid-Atlantic Ridge near lat 37 deg N show that the median valley can be divided into four provinces; the outer walls, terraces, inner walls, and floor. Block faulting along normal faults with as much as 600 m throw is the dominant mechanism for creating median-valley relief. Some of the major fault scarps are linear for more than 20 km. Large-scale block faulting occurs less than 1 km from the axis of spreading. Inversion of near-bottom magnetic anomalies suggests that the principal zone of intrusion may be no wider than 1 to 2 km and is along the valley axis. The central ridge is a volcanic construction, although faulting and (or) volcano-tectonic uplift may contribute to its relief. (Author)

AD-A016 427/7GA PC$3.75/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Mid-Infrared Spectral Behavior of Sedimentary Rocks.
Environmental research papers,
Graham R. Hunt, and John W. Salisbury. 2 Jul 75, 48p Rept nos. AFCRL-TR-75-0356, AFCRL-ERP-520

Descriptors: *Sedimentary rock, *Infrared detectors, Infrared spectra, Remote detectors, Intermediate infrared radiation, Rock forming minerals, Identification, Carbonate minerals, Absorption spectra, Atmospheres, Infrared windows, Limestone, Shale, Sandstone, Phosphates, Silicates, Clay minerals, Infrared signatures.
Identifiers: Multiband spectral reconnaissance, Remote sensing.

Mid-infrared (6- to 40-micrometer) spectra of sedimentary rocks and rock-forming minerals are presented. Molecular vibration bands are identified and the causes of spectral scatter among different samples of the same rock type are determined. It is concluded that mid-infrared spectra of sedimentary rocks are an excellent guide to their major mineral content. The chief drawback for terrestrial remote sensing of these rocks is that the major carbonate absorption band lies outside the atmospheric window. (Author)

AD-A016 644/7GA PC$3.25/MF$2.25
Wisconsin Univ Madison Dept of Geology and Geophysics
Controlled Source Dipole-Dipole Soundings of the Crust in Northern Wisconsin.
Final rept. 1 Jul 74-1 Jul 75,
C. S. Clay, and B. K. Sternberg. 1 Oct 75, 8p
Contract N00014-67-A-0128-0026

Descriptors: *Earth crust, Electrical resistivity, Wisconsin, Measurement, Anomalies, Sounding, Electromagnetic radiation, Direct current.

Controlled source electromagnetic and DC soundings of the crust have been made in northern Wisconsin. A relatively homogeneous region near the antenna was found. One-dimensional models of the crust were matched to these data. A major conductive anomaly has been found south of the antenna which extends deeply into the crust.

AD-A016 674/4GA PC$4.75/MF$2.25
Physics International Co San Leandro Calif
Examination of the Mechanical Properties for a Kayenta Sandstone from the Mixed Company Site.
Final rept. Jan 72-Dec 74,
R. P. Swift. 15 Jul 75, 76p Rept no. PIFR-397-482 DNA-3683F
Contracts DNA001-73-C-0077, DNA001-72-C-0075

Descriptors: *Explosion effects, *Sandstone, *Rock mechanics, Nuclear explosion simulation, Stress waves, Ground motion, Strain(Mechanics), Dynamic response, Dynamic loads, Colorado.
Identifiers: *Mixed Company shot.

An experimental and theoretical examination is conducted for the static and dynamic mechanical behavior of a highly porous, dry sandstone from the MIXED COMPANY event site. The static behavior is obtained from data of hydrostatic loading, uniaxial strain loading, and uniaxial stress loading to failure for various confining pressures. The dynamic behavior is obtained from data of plane wave, plate-impact tests and spherical stress wave tests using 5.08-cm-diameter explosive spheres. In-material measurements are made of the particle velocity and stress-time histories which characterize the dynamic response. The experimental results exhibit several complex featrues such as: irreversible compaction dependent upon both mean normal stress and shear stress; dilatancy; strain hardening and strain rate dependent response.

COM-75-11460/3GA
Mag Tape $1000.00;Foreign $1250.00
National Bureau of Standards, Washington, D.C.
Crystal Data Tape, Derived from the 3rd Edition of Crystal Data Determinative Tables.
Data file,
Robert C. Thompson. Jul 75, 1 reel mag tape
NBS-MAG-TAPE-9 NBS/DF-75/002
Specify tape recording mode desired: 9 track, 800 or 1600 bpi odd parity, EBCDIC; or 7 track, 556 or 800 bpi, odd or even parity, BCD. Conditional sales item. Customer must request a copy of lease from the Computer Products Program Manager.

Descriptors: *Data file, *Minerals, Crystal structure, Lattice parameters, Magnetic tapes, Chemical compounds.

This tape contains selected data from the 3rd Edition of the Crystal Data Determinative Tables (Donnay and Ondik, 1972, 1973). The tape was made by extracting certain data from the computer tapes used in the preparation of the book. The tape has been edited to correct errors found since the book has been published. Data for approximately 24,000 crystalline compounds are included. These data include cell parameters, Z, space groups, density measured, density calculated, formula, inorganic name, and determinative ratios. The data are divided into 12 files. Each file corresponds to an inorganic or organic system in the book.

PB-245 710/9GA Not available NTIS
Lamont-Doherty Geological Observatory, Palisades, N.Y.
Eolian Origin of Mica in Hawaiian Soils,
Pierre E. Biscaye, Jack Dymond, and Robert W. Rex. Jan 74, 5p LDGO-2000 NSF/IDOE-75-42
Grants NSF-GX-28671, NSF-GA-30794
Prepared in cooperation with Oregon State Univ., Corvallis. School of Oceanography, and Pacific Energy Corp., Los Angeles, Calif. Sponsored in part by Office of Naval Research, Arlington, Va. California Univ., Riverside. Inst. of Geophysics and Planetary Physics, IGPP-UCR-73-22.
Pub. in Geological Society of America Bull., v85 p37-40 Jan 74.

Descriptors: *Soils, *Mica, *Quartz, *Hawaii, Structural geology, Geochronology, Potassium, Strontium, Sediment transport, Lavas, Volcanology.
Identifiers: Oahu Island, Eolian processes, Reprints.

Mica-and quartz-bearing soils from the high-rainfall regions of the island of Oahu have been analyzed for their K-Ar and Rb-Sr age parameters to test for an eolian versus pedogenic origin of the mica. K-Ar and Rb-Sr apparent ages are approximately 100 times greater than the age of volcanism on the island. In addition, 87Sr/86Sr values for mica-bearing soils are as high as 0.7273 and contrast greatly with the nonradiogenic strontium in Hawaiian lavas (0.703 to 0.707). These measurements establish that the potassium- and strontium-bearing phases of the Hawaiian soils are not of local origin and confirm the importance of eolian transport of mica and other clays to the North Pacific.

8H. Hydrology and Limnology

COM-75-11459/5GA PC$7.25/MF$2.25
Hawaii Inst. of Geophysics, Honolulu.
Multimode Long Wave Transport in Irregular Basins.
Doctoral thesis,
Frank I. Gonzalez, Jr. May 75, 210p HIG-75-9
NOAA-75091711, NOAA-JTRE-135

Descriptors: *Hydrodynamics, *Canals, *River basins, Transport properties, Mathematical models, Partial differential equations, Matrices(Mathematics), Time series analysis, Harmonic functions, Numerical integration.

A generalized separation of variables technique known as multimoding is used to treat the partial differential equations governing time-harmonic, long wave oscillations in two-port basins. First, biorthogonal eigenfunction expansions are used to represent the surface elevation at each cross section of the basin (each eigenfunction in the expansion is interpreted as a spatial mode of the oscillation). Then the mode-amplitude coefficients of the expansion are found to be governed by a vector differential equation which evolves along the basin axis. The multimode approach thus reduces the original two-dimensional problem into a series of one-dimensional problems in the transverse and longitudinal directions, respectively. The second order multimode equations are next decomposed into a set of coupled first order equations for the left- and right-moving components of each mode (the two-flow decomposition). With the decomposition completed, Riccatian differential equations for the reflectance and transmittance scattering matrices are forthcoming, and transport techniques may therefore be applied to problems of general basin responses to external excitation.

E75-10420 PC$3.75/MF$2.25
Bendix Corp., Ann Arbor, Mich.
Application of Landsat to the Surveillance and Control of Lake Eutrophication in the Great Lakes Basin.
Progress rept. 11 May-11 Aug 75,
Robert H. Rogers. Aug 75, 45p BSR-4191, BSR-4192 NASA-CR-143409
Contract NAS5-20942
Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Lakes, Eutrophication, Wisconsin, Great Lakes(North America), Structural basins, Saginaw Bay(Mi), Land use, Water quality, Earth resources program, Data processing.

The author has identified the following significant results. By use of distilled water samples in the laboratory, and very clear lakes in the field, a technique was developed where the atmosphere and surface noise effects on LANDSAT signals from water bodies can be removed. The residual signal dependent only on the material in water, used as a basis for computer categorization of lakes by type and concentration of suspended material. Several hundred lakes in the Madison and Spooner, Wisconsin area were categorized by computer techniques for tannin or nontannin waters and for the degree of algae, silt, weeds, and bottom effects present. When the lakes are categorized as having living algae or weeds, their concentration is related to the enrichment or eutrophication of the lake.

E75-10422 PC$3.25/MF$2.25
Bundesanstalt fuer Bodenforschung, Hanover (West Germany).
Hydrogeological Investigations in the Pampa of Argentina.
Rept. no. 1 (Final); Dec 73-Nov 74,
Dieter Bannert, H. Bender, W. Kruck, and J. J. Lago. Nov 74, 24p NASA-CR-143410
Original contains imagery. Original photography may be purchased from the EROS Data

Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Argentina, Ground water, Salinity, Pampas, Rivers, Dunes, Earth resources program, Hydrology, Terrain analysis.

The author has identified the following significant results. Satellite imagery in combination with ground investigations allows identification and delineation of differences in the conditions of the near surface ground water (depth to ground water, salinity). The degree of precision achieved is greater than that obtainable by conventional ground survey methods alone.

PB-245 589/7GA PC$3.75/MF$2.25
Geological Survey, Menlo Park, Calif. Water Resources Div.
Artificial Recharge in the Upper Santa Ana River Area, San Bernardino County, California.
Final rept.,
Donald H. Schaefer, and James W. Warner. Jul 75, 33p USGS/WRI-15-75, USGS/WRD-75/054
Prepared in cooperation with San Bernardino Valley Municipal Water District, Calif.

Descriptors: *Ground water recharge, *Hydrogeology, Drilling, Aquifers, Pumping, Water wells, Permeability, California.
Identifiers: San Bernardino County(California), Artificial recharge.

By 1990 the San Bernardino Valley Municipal Water District will be receiving 102,000 acre-feet (1.3 x 10 to the 8th power cubic metres) per year of imported northern California water to be used for artificial recharge to the local groundwater system. The upper Santa Ana River area is suited for artificial recharge because it is largely underlain by permeable river-channel deposits. Some sandy clay, silt, and cemented sand and gravel layers may locally retard downward percolation of recharge water. However, test drilling indicates none of these is extensive enough to impede recharge in the spreading grounds. Analyses of ground-water movement during current spreading operations, test-drilling data, and application of Baumann's (1965) equation for calculating the theoretical recharge mound indicate that (1) barriers to ground-water movement are not evident in the river-channel deposits, (2) depth to basement complex is less in the area of the eastern spreading basins than in the western basins, (3) the spreading grounds are capable of accepting as much as 80,000 acre-feet (9.9 x 10 to the 7th power cubic metres) per year, and (4) the water being recharged should move through the aquifer toward the areas of pumpage.

PB-245 626/7GA PC$3.75/MF$2.25
Geological Survey, Madison, Wis. Water Resources Div.
Hydrology of the Lake Wingra Basin, Dane County, Wisconsin.
Final rept.,
E. L. Oakes, G. E. Hendrickson, and E. E. Zuehls. Jul 75, 43p USGS/WRI-17-75, USGS/WRD-75/055
Prepared in cooperation with Wisconsin Geological and Natural History Survey, Madison.

Descriptors: *Hydrology, *Ground water, *Lake Wingra Basin, Water flow, Surface water runoff, Evaporation, Precipitation(Meteorology), Water wells, Water quality, Surveys, Water loss, Wisconsin.
Identifiers: Dane County(Wisconsin).

A water budget was prepared to identify the components of the hydrologic system in the Lake Wingra basin. The Lake Wingra basin, which includes a small eutrophic lake within the city of Madison, Wisconsin, is partly natural and partly urbanized. Measured and estimated inflow and outflow to and from the lake in one year (June 1972 to May 1973) was about 4.5 metres (15 feet)--approximately twice the volume of the lake. Lake gains are about 25 percent from precipitation on the lake surface, and from nearly equal amounts of surface runoff and ground-water inflow. Lake losses are about 10% ground-water outflow, 15% evaporation from the lake surface, and 75% discharge at the surface outlet. Increased pumpage from municipal and industrial wells in Madison has slowed the flow through the lake. The calculated 1972 water budget for the lake showed gains of about 356 centimetres (140 inches) and losses of about 350 centimetres (138 inches). A discrepancy of about 6 centimetres (2 inches) probably was caused by uncertainties in ground-water inflow and outflow and by evapotranspiration and ground-water inflow in the marsh area southwest of the lake.

PB-246 055/8GA PC$28.25/MF$2.25
Arizona Univ., Tucson. School of Renewable Natural Resources.
Water Yield Improvement by Vegetation Management Focus on Arizona.
Final rept.,
Peter F. Ffolliott, and David B. Thorud. 1975, 1094p UA/SRNR-75/01
Contract DI-14-31-0001-3803
Sponsored by Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. Arizona Water Commission, Phoenix, and Arizona Water Resources Research Center, Tucson.

Descriptors: *Water resources, *Watersheds, *Vegetation, *Arizona, Land use, Forest land, Climate, Runoff, Surface waters, Snowmelt, Pine trees, Fir trees, Grassland, Deserts, Water quality, Fisheries, Wildlife, Bibliographies, Reviews.

This assessment of the potentials for increasing water yield in Arizona by means of vegetation management is based on a review of the Arizona Watershed Program, which began in 1957. A separate, detailed summary of research is provided for: alpine, mixed conifer, aspen, ponderosa pine, pinyon-juniper, chaparral, grassland, desert shrub, and riparian. Some of the topics covered are vegetation, climatic, edaphic, physiographic; and wildlife and fisheries characteristics and treatment effects on water yield, water quality, forage, and timber production. An estimate is made for water yield results if mixed conifer forests, ponderosa pine forests, and chaparral vegetation zones were treated at different intensities, for each of 15 basins in Arizona. These estimates have a hypothetical structure and are presented for demonstrating the upper potentials for water yield improvement, according to research results from experimental watersheds. Bibliographies follow each of the vegetation type chapters.

8I. Mining Engineering

AD-A016 678/5GA PC$7.25/MF$2.25
Bureau of Mines Washington D C
ARPA-Bureau of Mines Rock Mechanics and Rapid Excavation Program, A Research Project Summary.
Information circular, 1970-72,
James J. Olson, and Keith S. Olson. Aug 75, 202p Rept no. BuMines-IC-8674

Descriptors: *Rock, *Excavation, Rock mechanics, Tunneling, Water jets, Guns, Lasers, Electron beam melting, Supports, Materials handling.
Identifiers: *Rapid excavation, *Tunnel supports.

This Bureau of Mines publication reviews the research conducted under a three-year, $6.6 million program in rock mechanics and rapid excavation. The program was sponsored by the Defense Department's Advanced Research Projects Agency (ARPA) and was managed by the Bureau. In addition to the rock mechanics investigations, projects were funded in the following general areas of rapid excavation: Systems analysis, geologic prediction, rock disintegration, ground support, and materials handling. This report briefly summarizes the significant technical accomplishments of the individual research projects and references the contract reports and other publications where more detailed descriptions of the research can be obtained.

8J. Physical Oceanography

AD-A016 290/9GA PC$7.25/MF$2.25
City Coll New York
Seasonal Changes of Oceanographic and Marine-Climatological Conditions in the Equatorial Atlantic.
Final rept.,
Gerhard Neumann, William H. Beatty, III, and Edward C. Escowitz. Aug 75, 221p
Contract N00014-72-A-0406-0007

Descriptors: *Marine meteorology, *Oceanographic data, *Atlantic Ocean, Ocean surface, Surface temperature, Evaporation, Salinity, Atmospheric precipitation, Equatorial regions, Seasonal variations, Harmonic analysis, Graphs, Meteorological charts.

An attempt is made to construct more detailed monthly charts for sea surface temperature, salinity, evaporation and precipitation, based on climatological averages for 2 degrees squares betweem 10N and 10 degrees S. This space and time resolution, at least, is required to study the complex climatological and mean oceanographic conditions, and their interrelationships, in an ocean area where significant local differences can occur at distances of a degree or two of longitude or latitude apart, and where semi-annual periodic changes may dominate the seasonal pattern. Of special interest are the relationships between sea surface salinity variations during the year and the differences between evaporation and precipitation. Special attention is given to seasonal variations of sea surface temperature anomalies, surface salinities and precipitation in the 5N to 10 degrees N latitudinal belt. This zonal belt is, essentially, dominated by the Equatorial Countercurrent.

AD-A016 352/7GA PC$4.25/MF$2.25
Sparcom Inc Alexandria Va
A New Concept for a Rapid Surveillance Acoustic Bathymetric System.
Technical rept.,
G. D. Hickman. May 75, 55p
Contract N00014-71-C-0202

Descriptors: *Bathymetry, *Acoustic equipment, *Oceanographic equipment, *Echo ranging, Ocean surveillance, Airborne, Shallow water, Interfaces, Sound transmission, Air to underwater, Surface roughness, Ocean surface, Extremely low frequency, Feasibility studies, Underwater sound.

An extensive study of existing data was made to determine the feasibility of using an airborne acoustic system for bathymetry of shallow waters. The total signal sound pressure for acoustic frequencies of < or = 2000Hz, is calculated as -132db for the case where the transceiver is located 10 meters above a smooth water surface and the water depth is 10 meters. Estimates have been made for additional losses due to rough surfaces and higher acoustic frequencies (> or = kHz). Lack of data, especially at higher frequencies, prevents a definitive statement from being made as to the feasibility of this acoustic application.

AD-A016 612/4GA PC$5.25/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
Experimental Applications of the Modular Acoustic System for the Submersible ALVIN.
Final technical rept. 1 Feb-31 Aug 75,
Paul T. McElroy. Aug 75, 108p Rept no. BBN-3110
Contract N00014-75-C-0659

Descriptors: *Underwater sound equipment, *Deep submergence vehicles, Acoustic measurement, Ocean bottom soils, Ocean bottom topography, Porosity, Scattering, Fishes, Underwater sound, Submersibles, Oceanographic equipment, Deep scattering layers, Reflectivity, Sediments.
Identifiers: *Alvin vessel, Manned submersibles, Modular acoustic systems.

The Modular Acoustic System is a broadband general purpose acoustic measurement system designed for use on the submersible ALVIN. This report discusses four general areas for experimental research where the design features of the System, coupled with ALVIN's special capabilities, are particularly appropriate. The areas are: (1) Bottom reflectivity as a function of both frequency and angle of incidence, with particular attention to the porosity created in marine sediments by large populations of marine tube-building organisms, including polychaete worms and pogonophorans; (2) Scattering, as a function of frequency, from fish of the deep scattering layer in those special cases where only one species and one size of fish is present; (3) Measurement of the small-scale topography of the ocean bottom, and relation of that topography to scattering of energy measured as a function of frequency and angle; (4) Near-bottom seismic profiling at 3.5 kHz and higher frequencies.

AD-A016 657/9GA PC$3.25/MF$2.25
Lehigh Univ Bethlehem Pa Marine Geotechnical Lab
Research on the Mass Physical and Engineering Properties of Deep-sea Sediments.
Final rept.,
Adrian F. Richards. 5 Sep 75, 17p
Contract N00014-67-A-0370-0005

Descriptors: *Ocean bottom, *Sediments, Ocean bottom sampling, Core sampling, Deep water, Instrumentation.

This report discusses field geotechnical equipment, laboratory geotechnical equipment and procedures, and field geotechnical investigations.

N75-31696/8GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Data Report of Four Free-Drifting Buoys Tracked by the Eole Satellite in the Western North Atlantic Ocean in the Winter of 1973.
J. W. Wallace, and J. W. Usry. Sep 75, 24p
NASA-TM-X-72768

Descriptors: *Atlantic ocean, *Buoys, *Water temperature, Coastal water, Continental shelves, Eole satellites, Satellite observation, Tables (Data), Trajectories.

For abstract, see STAR 1322

PB-245 416/3GA PC$5.25/MF$2.25
Washington, Univ., Seattle. Dept. of Oceanography.
Coastal Upwelling Ecosystems Analysis. Technical Report 4. An Automated Contouring System for the Interactive Real-Time Information System (IRIS),
James C. Kelley, and James L. Rix. Jan 74, 112p
Ref-M74-05 NSF/IDOE-75-48
See also PB-224 616, and PB-245 417.

Descriptors: *Oceanographic charts, *Photogrammetry, *Oceanographic data, Contours, Mapping, Aerial photographs, Grids(Coordinates), Information systems, Map projection, Real time operations, Computer programs, Ocean temperature, Salinity, Nitrate minerals, Coasts, FORTRAN.
Identifiers: *Interactive Real Time Information System, International Decade of Ocean Exploration, Ecosystems, Computer aided mapping.

The report details an automated contouring system designed for use on the Interactive Real-Time Information System (IRIS), a shipboard computing system developed within the Coastal Upwelling Ecosystems Analysis program. This contouring system has its origins primarily in two earlier systems which have been in use for a number of years. These systems have been modified through the past few years, and a great deal of experience has been gained in their use. The system presented here uses a least squares polynomial interpolation to a rectangular grid, and then contours the grid. A detailed program description and some examples of its use are presented in the technical report.

PB-245 420/5GA PC$4.75/MF$2.25
Washington Univ., Seattle. Dept. of Oceanography.
Coastal Upwelling Ecosystems Analysis. Technical Report 9. An Atlas of Sea Surface Maps of Temperature, Nutrients and Chlorophyll from Peru, March and April, 1969,
J. C. Kelley, and T. E. Whitledge. Feb 75, 89p
Ref-M75-16 NSF/IDOE-75-53

Descriptors: *Oceanographic charts, *Oceanographic data, *South Pacific Ocean, *Ecology, Coasts, Atlases, Nutrients, Chlorophylls, Ocean surface, Nitrate minerals, Marine biology, Ocean temperature, Silicate minerals, Upwelling, Peru.
Identifiers: International Decade of Ocean Exploration, Thomas G. Thompson Vessel, Ecosystems.

During March and April, 1969, the PISCO cruise was carried out on the R/V Thomas G. Thompson in the area of Punta San Juan, Peru (15 degrees S). During the cruise, 24 surface maps of temperature, nitrate, silicate, nitrate/silicate ratio and fluorescence as a measure of chlorophyll, were constructed. This atlas presents the complete set of available maps which have been edited and redrawn from the original computer output. This collection shows the scale of variability which can be observed from synoptic sampling techniques. The units for the variables are Temperature (degrees C), Nitrate (micrograms-at./liter), Silicate (micrograms-at./liter), Chlorophyll-a micrograms/liter).

8L. Snow, Ice, and Permafrost

AD-A016 295/8GA PC$5.25/MF$2.25
Photographic Interpretation Corp Hanover N H
Interpretation of Winter Ice Conditions from SLAR Imagery.
Final rept. Nov 71-Feb 72,
V. H. Anderson, R. B. Arend, and M. J. Lynch.
Feb 72, 105p DOT-CG-14486-1A
Contract DOT-CG-14486

Descriptors: *Sea ice, *Ice, *Side looking radar, *Photointerpretation, Radar images, Patterns, Winter, Summer, Thickness, Snow Cover, Correlation techniques.
Identifiers: DOT/4GZ/GA, Lake ice.

Side-Looking Airborne Radar (SLAR) provides an all weather, all light level medium for imaging large areas of saline and fresh water ice. This report evaluates the use of SLAR imagery for determining winter sea and lake ice parameters and compares winter sea ice pattern 'keys' with summer pattern 'keys'. The report also makes a preliminary evaluation of the effects of snow cover on the SLAR imagery and on the interpretation of ice conditions. In addition, an interpretation technique is developed which permits the interpreter to analyze ice environments to a greater degree than is possible through the use of image pattern keys. The study points out the requirement for additional research to correlate lake ice image patterns with age, thickness, condition, and snow cover parameters through a combined remote sensor and on-ice study.

AD-A016 641/3GA PC$7.25/MF$2.25
Raytheon Co Arlington Va Autometric Operation
Data Reduction of Airborne Sensor Records.
Final rept. 1 Mar-31 Jul 70,
Richard A. Bradie, Alex Bay, Andrew Biache, Carl Mann, and Clinton Peppard. Jul 70, 210p
Rept no. FR-1385
Contract DOT-CG-01800-A
Report on Data Reduction of Sea Ice Records.

Descriptors: *Sea ice, *Image processing, *Remote detectors, Side looking radar, Panoramic cameras, Infrared scanning, Lasers, Detectors, Data processing, Photography, Photographs, Arctic Regions.
Identifiers: *Remote sensing, Spaceborne photography, DOT/4IZ/IE.

The capabilities of four remote sensors - panoramic camera, thermal infrared scanner, laser profiler and side-looking airborne radar - were examined to determine level of ice detail of code, individually and in combination. Textual descriptions of each sensor's ability to detect sea and fast ice conditions and phenomena are presented, along with photographic examples of ice types depicted on each sensor's record. Color illustrations reproduced in black and white.

AD-A016 731/2GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Toward an Ice-Free Arctic Ocean.
Technical rept.,
K. Aagaard, and L. K. Coachman. 1975, 5p Rept no. TR-15
Contract N00014-67-A-0103-0021
Availability: Pub. in EOS, Transactions, American Geophysical Union, v56 n7 p484-486 Jul 75.

Descriptors: *Sea ice, *Arctic Ocean, Circulation, Salinity, Stratification, Convection(Heat transfer), Sea water, Temperature, Rivers, Siberia, Diverting, Heat flux, Reduction, Reprints.
Identifiers: Ice free areas, Ocean basins.

The strong salinity stratification of the Arctic Ocean prevents substantial ice-free conditions in winter by suppressing convection and reducing upward heat flux from the Atlantic Water. These conditions would be significantly altered in the sensitive southern Eurasian basin if suggested diversions of western Siberian rivers were accomplished. (Author)

E75-10424 PC$4.75/MF$2.25
Environmental Research and Technology, Inc., Concord, Mass.
Study to Develop Improved Spacecraft Snow Survey Methods Using Skylabs/EREP Data.
Final rept. Mar 73-May 75,
J. C. Barnes, M. D. Mallwood, and J. L. Cogan.
May 75, 98p NASA-CR-144388
Contract NAS9-13305
Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Snow, Cloud cover, Ground truth, Arizona, Sierra Nevada Mountains(CA), Utah, Plateaus, Agriculture, Mississippi River(U.S), Structural basins, EREP, Skylab program, Multispectral band cameras, Resolution, Maps, Image contrast.

The author has identified the following significant results. Of the four black and white S190A camera stations, snowcover is best defined in the two visible spectral bands, due in part to their better resolution. The overall extent of the snow can be mapped more precisely, and the snow within shadow areas is better defined in the visible bands. Of the two S190A color products, the aerial color photography is the better. Because of the contrast in color between snow, snow-free terrain and the better resolution, this product is concluded to be the best overall of the six camera stations for detecting and mapping snow. Overlapping frames permit stereo viewing, which aids in distinguishing clouds from the underlying snow. Because of the greater spatial resolution of the S190B earth terrain camera, areal snow extent can be mapped in greater detail than from the S190A photographs. The snow line elevation measured from the S190A and S190B photographs is reasonable compared to the meager ground truth data available.

8M. Soil Mechanics

AD-A016 787/4GA PC$4.25/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Design and Potentials of the Californium-252 Radiation Facility at WES.
Final rept.,
Jack T. Lewis, and Ellis L. Krinitzsky. Sep 75, 68p Rept no. AEWES-Misc-Paper-S-75-26

Descriptors: *Radioactive isotopes, *Soil surveys, *Rock mechanics, Moisture, Density, Radiation shielding, Radiography, Neutrons, Test facilities.
Identifiers: *Californium 252, *Neutron sources.

A facility was designed and subsequently has been built for the utilization of californium-252 in research on moisture, density, and other properties of soil and rock in relation to their engineering characteristics. Preliminary testing shows good correlations between neutron radiation and the quantification and distribution of moisture both in soil slices and steel-encased undisturbed soil samples. Such data, when used in conjunction with X-ray studies, are valuable in furthering the knowledge and understanding of soil and rock behavior. Continued research will refine techniques for more detailed study of properties of earth materials. Detailed plans of the facility and its components are given in Appendix A.

PB-245 427/0GA PC$3.25/MF$2.25
Purdue Univ., Lafayette, Ind. Joint Highway Research Project.
Pore Size Distribution of Compacted Soils After Critical Region Drying.
Final rept., Executive summary,
R. N. Bhasin. 4 Jun 75, 8p JHRP-75-3
See also PB-245 182.

Descriptors: *Soil compacting, *Porosity, Drying, Moisture content, Measurement, Soil tests, Clay soils.
Identifiers: DOT/4BZ/BA.

The main objective of this study was to investigate the pore size distributions of a variety of clayey soils (a) after compaction of the soils at different levels of the soil and compaction variables, and (b) after exposing the compacted soils to soaking under a nominal surcharge pressure designed to partly simulate the influence of the service environment on the compacted condition. Based on the extensive series of pore size distributions measured in this study it was concluded that: (1) The techniques used in this study for measuring pore size distributions, and involving critical region drying and mercury intrusion, are reliable. (2) Different soils, compacted to a given percentage compaction on the dry side of Standard Proctor optimum moisture content, have different total porosites. Furthermore, the pore size distributions of the various soils compacted in this manner are significantly different from each other.

8N. Terrestrial Magnetism

AD-A016 332/9GA PC$3.25/MF$2.25
Rosenstiel School of Marine and Atmospheric Science Miami Fla
Areal Coverage of Spurious Reversals of the Earth's Magnetic Field,
C. G. A. Harrison, and E. Ramirez. 20 Aug 74, 14p
Contract N00014-67-A-0201-0013, Grant NSF-GX-36155
Availability: Pub. in Jnl. of Geomagnetism and Geoelectricity, v27 p139-151 1975.

Descriptors: *Geomagnetism, Reversible, Magnetic fields, Paleontology, Magnetic moments, Dipoles, Reprints.
Identifiers: Laschamp event, Paleomagnetism.

The Laschamp event ended between 8000 and 20000 years ago. In several other parts of the world, excursions of the Earth's magnetic field have been seen at about this time interval, but at other parts, notably in the Aegean sea, there is no evidence for a reversal or excursion of the field during this time. By using a two dipole model, it is shown that it is possible to produce an apparent reversal at one point on the Earth's surface, which produces deviations in the direction of the magnetic field over a rather small area around the position of reversal. The two dipoles used were a centered axial dipole to model the main magnetic field, and a dipole located at the top of the core, to produce the reversed field above it. The models show that the data from the Aegean sea are not contradictory with the Laschamp event provided that it is a pseudo reversal. This model has also shown that if the non-dipole field is caused by horizontal electric currents at the top of the core, then pseudo reversals are more likely to occur at high latitudes than at low latitudes.

AD-A016 517/5GA PC$3.25/MF$2.25
Alaska Univ College Geophysical Inst
North-South Component of the Interplanetary Magnetic Field and Large Scale Auroral Dynamics,
S.-I. Akasofu. 18 Mar 75, 3p Rept no. UAG-Contrib-B374 AFCRL-TR-75-0538
Contract F19628-72-C-0301
Availability: Pub. in Nature, v256 n5514 p191-192, 17 Jul 75.

Descriptors: *Magnetosphere, *Aurorae, Magnetic storms, Interplanetary space, Magnetic fields, Directional, Intensity, Reprints.
Identifiers: Auroral oval.

An important quantity S which controls both the occurrence of magnetospheric substorms and their intensity is found. It can be estimated from the size of the auroral oval.

COM-75-11403/3GA PC$3.25/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.
A Computer Processing Method for Real-Time Magnetometer Observations.
Technical memo.,
Larry J. Gardner, and Charles E. Hornback. May 75, 8p NOAA-TM-ERL-SEL-40 NOAA-75091806

Descriptors: *Magnetometers, *Magnetic measurement, Geomagnetism, Magnetic fields, Measurement, Real time, Automation.
Identifiers: Computer applications.

A computer method that has been developed for estimating the K-indices and gamma deviations of a ground-based magnetometer is discussed. The results give automated, real-time observations that are suitable for operational applications.

N75-31620/8GA PC$3.25/MF$2.25
Florida Inst. of Tech., Melbourne. Dept. of Physics and Space Sciences.
Correlation of the Earth'S Rotation Rate and the Secular Change of the Geomagnetic Field.
Final Technical Report, 1 Dec. 1974 - 31 Aug. 1975.
R. S. Jin. 31 Aug 75, 18p NASA-CR-143623
Grant NSG-5038

Descriptors: *Earth rotation, *Geomagnetism, *Harmonic analysis, *Power spectra, Algorithms, Dipole moments, Harmonics, Magnetic dipoles, Solar cycles, Universal time.

For abstract, see STAR 1322

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A016 432/7GA PC$4.25/MF$2.25
Westinghouse Research Labs Pittsburgh Pa
High Power Microwave Field Effect Transistor Development.
Final technical rept. 1 Oct 73-30 Sep 74,
M. C. Driver, M. J. Geisler, H. Yamasaki, D. L. Barrett, and J. G. Oakes. Aug 75, 62p RADC-TR-75-190
Contract F30602-74-C-0055

Descriptors: *Field effect transistors, Gallium arsenides, Microwave equipment, Schottky barrier devices, Gates(Circuits), High power.

Work is concentrating on gallium arsenide devices rather than silicon to take advantage of the higher mobility. Two fabrication techniques are being used to construct arrays of unit cells on GaAs wafers. The first technique requires realignment of multiple photomasks and has given the best performance but is more costly. The second technique uses only one photomask and the gate is self-aligned between the source and drain metalization. Both unit cells are designed for approximately one watt. The realigned cell has an active length of 1500 microns, and measures about 8 mils by 12 mils. This cell was tested at 3.5 GHz with .6 watts output, 18 db of gain, and 15% efficiency. The efficiency would be much improved in a better test fixture. The self-aligned gate cell has an active length of 2500 microns and measures 12.5 mils by 17 mils. This cell was tested at 4 GHz with one watt of power output, 6 db of gain and 39% drain efficiency or 34.7% overall efficiency.

AD-A016 481/4GA PC$6.25/MF$2.25
RCA Corp Burlington Mass Government Communications and Automated Systems Div
Camera Tube for Space Surveillance.
Final rept. 1 Apr-29 Nov 74,
M. J. Cantella, T. W. Edwards, R. W. Engstrom, O. H. Schade, Sr., and M. W. Stewich. Sep 75, 162p AFAL-TR-75-79
Contract F33615-74-C-1089

Descriptors: *Camera tubes, Space surveillance systems, Electron beams, Semiconductor devices, Electron tube targets, Electron optics, Image intensifiers(Electronics), Vidicons, Fiber optics, Silicon.

The design study included parametric analysis of the factors which affect the design of camera tubes for space surveillance. Surveillance, expressed in terms of sensitivity, coverage, and angular velocity cutoff, can be maximized by increasing the spatial resolution (N sub e) and format size of the sensor. To achieve photoelectron noise limited surveillance, pretarget gain is necessary. The best approach for obtaining this gain at high resolution is the use of a magnetically focussed intensifier section coupled to a magnetically focussed and deflected scanning section. This can be accomplished in a timely manner with low technical risk by coupling either a single silicon impact ionization or a double intensifier section to the scanning electron optics of the 4-1/2-inch Return Beam Vidicon. This tube would have a 72mm target and a resolution (N sub e) level eight times greater than that of currently available sensors. Typical space surveillance system benefits include 64 times more coverage, 2.3 M sub v more sensitivity, and a factor of eight improvement in satellite velocity coverage.

AD-A016 576/1GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
A Method to Predict the Thermal Performance of Printed Circuit Board Mounted Solid State Devices.
Final rept.,
Matthew D. Kelleher. 31 Jul 75, 57p Rept no. NPS-59-Kk75071

Descriptors: *Solid state electronics, Thermal analysis, Printed circuits, Circuit boards, Reliability(Electronics), Predictions, Cooling, Heat transfer, Computer programs, FORTRAN.
Identifiers: Solid state devices, FORTRAN 4 programming language.

The objective was to formulate a design procedure to be used in the prediction of the thermal performance of printed circuit board mounted solid state devices (specifically 14 and 16 pin DIP's and TO-3 and TO-66 transistor cases). The project consists of an analytical phase which constitutes the actual formulation of the design procedure in the form of a digital computer program with appropriate documentation and an experimental phase which involves testing of actual P-C boards to verify the analytical model.

AD-A016 688/4GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Coherent Integration and Correlation in a Modified Acoustoelectric Memory Correlator.
Journal article,
Kjell A. Ingebrigtsen, and Ernest Stern. 12 May 75, 4p Rept no. JA-4524 ESD-TR-75-273
Contract F19628-73-C-0002, ARPA Order-2006
Availability: Pub. in Applied Physics Letters, v27 n4 p170-172, 15 Aug 75.

Descriptors: *Schottky barrier devices, *Memory devices, *Correlators, Semiconductor diodes, Analog signals, Arrays, Integration, Polycrystalline, Silicon, Reprints, Charge carriers.
Identifiers: *Acoustoelectric memory correlators.

The storage, correlation, and coherent integration of analog signals in a Schottky diode acoustoelectric memory correlator is described. The experiments demonstrate storage of phase and amplitude of a 70-MHz signal by the distribution of charge in an array of Schottky diodes. Coherent integration is obtained by accumulating a succession of charges in highly resistive polycrystalline silicon islands. Coherent integration over a time period of several tens of milliseconds is reported. (Author)

AD-A016 697/5GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Fabrication of Silicon MOS Devices Using X-Ray Lithography.
Journal article,
Stephen E. Bernacki, and Henry I. Smith. 5 Feb 75, 9p Rept no. JA-4464 ESD-TR-75-268
Contract F19628-73-C-0002
Availability: Pub. in IEEE Transactions on Electron Devices, vED-22 n7 p421-428 Jul 75.

Descriptors: *Metal oxide semiconductors, *Transistors, *Lithography, Silicon, Wafers, Annealing, Fabrication, X rays, Reprints.
Identifiers: X ray lithography.

This paper reports on the high-yield fabrication of silicon MOS transistors using X-ray lithography, measurements and annealing of fast surface states and oxide charges created by X-ray irradiation, and design considerations for submicrometer linewidth X-ray lithography on 7.5-cm diameter silicon wafers. (Author)

AD-A016 703/1GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
A Schottky-Diode Acoustic Memory and Correlator.
Journal article,
Kjell A. Ingebridtsen, Ronald A. Cohen, and Robert W. Mountain. 24 Feb 75, 4p Rept no. JA-4489 ESD-TR-75-235
Contract F19628-73-C-0002, ARPA Order-600
Availability: Pub. in Applied Physics Letters, v26 n11 p596-598, 1 Jun 75.

Descriptors: *Schottky barrier devices, *Memory devices, *Acoustic signals, *Correlators, Surface waves, Delay lines, Matrices(Circuits), Silicon, Niobates, Reprints.
Identifiers: Lithium niobate.

Experiments demonstrate that images of acoustic signals can be stored for tens of msec in a matrix of Schottky diodes on a silicon surface adjacent to a lithium niobate surface-wave delay line. The experiments show charging times of the order of 10 nsec. (Author)

AD-A016 705/6GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Planar InSb Photodiodes Fabricated by Be and Mg Ion Implantations.
Journal article,
Charles E. Hurwitz, and Joseph P. Donnelly. 13 Nov 74, 5p Rept no. JA-4452 ESD-TR-75-230
Contract F19628-73-C-0002
Availability: Pub. in Solid-State Electronics, v18 n9 p753-756 1975.

Descriptors: *Photodiodes, *Ion implantation, Ions, Wavelengths, Doping, Indium antimonides, Beryllium, Magnesium, Fabrication, Reprints.

Planar p-n junction photodiodes in InSb have been made by ion implantation of Be and Mg acceptors. Both ions were incorporated with a doping efficiency of about 50 per cent and each produced excellent photodiodes. At 77 K, 20-mil-dia. diodes have typical zero-bias resistances of 6 ohms. At the wavelength peak of 5.3 micrometers, quantum efficiencies of 60-70 per cent and detectivities with a 77 K background of 2 time 10 to the 12th power cm square root of (Hz)/W were measured. Field plate guard rings were used to adjust the surface potential at the diode perimeters for optimum performance. (Author)

AD-A016 741/1GA PC$3.25/MF$2.25
North Dakota Univ Grand Forks

Thermistor Reliability and Accuracy at High Pressure,
B. De Boer, L. C. Stetzner, and F. R. O'Brien. 1975, 1p
Contract N00014-68-A-0499
Availability: Pub. in American Laboratory, 1p Oct 75.

Descriptors: *Thermistors, *Hyperbaric chambers, *Body temperature, Reliability, Probes, Accuracy, High pressure, Decompression, Reprints.

In our laboratory we routinely utilize the thermistor sensor for measurement and thermostatic control of temperature in the hyperbaric chamber and for recording body temperatures of animals during compression and hyperbaric exposures. In view of the fact that some sensing devices are known to be unreliable at high pressures, the authors establish the dependability of the thermistors under the conditions of the experiments.

AD-A016 759/3GA PC$5.75/MF$2.25
Sperry Research Center Sudbury Mass
Controlled Inversion Devices.
Final rept. 1 Jul 74-30 Jun 75,
Harry Kroger, and H. A. Richard Wegener. Jul 75, 134p Rept no. SCRC-CR-75-15 AFCRL-TR-75-0423
Contract F19628-74-C-0074, ARPA Order-2676

Descriptors: *Semiconductor devices, Inversion, Electrical impedance, Integrated circuits, Silicon, Silicon nitrides, Amorphous materials, Nonlinear systems, Capacitance.
Identifiers: *Controlled inversion devices, Large scale integrated circuits.

Three terminal controlled inversion devices were fabricated and the properties studied. Base current drive as low as 2 microamps were sufficient to lower collector threshold voltages 0.6 V. Reliable switching of 100 mA currents was possible. Properties of devices fabricated of silicon nitride, silicon oxynitride and amorphous silicon as the thin insulator material were investigated. The reproducibility, lack of interaction between adjacent collector electrodes, and base current sensitivity of devices fabricated with polysilicon and amorphour suggest that further work on ths material be emphasized.

AD-A016 777/5GA PC$5.75/MF$2.25
Airesearch Mfg Co of California Torrance
Development Program for a Large Planar Beam Electron Gun.
Final rept. 18 May 72-13 Dec 74,
Arthur H. Bauer. Sep 75, 142p AFWL-TR-75-101
Contract F29601-72-C-0118

Descriptors: *Electron guns, Electron beams, Planar structures, Electron optics, Lightweight.

The report presents results of a program to develop a lightweight, large planar beam electron gun. The program included design, fabrication, and test of a working model gun of less than 205 pounds with a 2000 sq cm output beam. The gun displays unique characteristics due to the use of parallel diodes, small-area thermionic emitters, titanium vacuum vessel, high-current capacity output window structure, and lightweight copper vacuum seals. Pulsed operation of the gun at voltages from 120 to 200 kv and pulse repetition frequencies up to 1000 Hz for 10- to 30-microsec pulses was a design requirement. Current densities of 9 ma/sq cm have been demonstrated at accelerating voltages up to 150 kv. Output beam uniformity has been measured by use of dosimeter paper. Uniformity of the beam is within 5 percent. Gun current efficiency as high as 70 percent has been measured.

AD-A016 915/1GA PC$4.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Transduction of Acoustic Surface Waves by Interdigital Arrays, and Equivalent Circuit Representations.
Technical rept.,
Arthur Ballato. Oct 75, 55p Rept no. ECOM-4359

Descriptors: *Transducers, Surface waves, Acoustic waves, Piezoelectric crystals, Arrays, Field intensity, Analog simulation.
Identifiers: *Interdigital transducers, Acoustic surface waves, Equivalent circuits.

Analog network representations are given for crossed-field and in-line excitation of acoustic surface waves on piezoelectric crystals. Advantages of the analog formulation of the circuits are discussed and compared with earlier models. Enhanced physical insight, flexibility in adapting the circuits to describe modifications in device structure, and a rational approach to the approximation problem are the primary motivations for adopting models of this kind. Appendices describe electric field calculations, lumped element transmission line approximations, and piezoelectric forces produced by electrode arrays.

AD-A016 916/9GA PC$3.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Alteration of Temperature Coefficients in Mass-Loaded Crystal Vibrators.
Technical rept.,
Arthur Ballato. Oct 75, 13p Rept no. ECOM-4360

Descriptors: *Crystal oscillators, Piezoelectric crystals, Temperature coefficients, Quartz resonators, Frequency, Control, Computations.

Effects of mass-loading and harmonic on the resonance and antiresonance temperature behavior of a piezoelectric plate vibrator are described, in the one dimensional approximation, for thickness- and lateral-field excitation. Applications to rotated-Y-cut quartz cuts are given.

AD-A016 939/1GA PC$4.25/MF$2.25
California Univ Los Angeles School of Engineering and Applied Science
Long Term Memory in Junction Devices Using Multivalent Trapping Impurities in Silicon.
Semiannual rept. 1 Sep 74-31 Jan 75,
J. W. Holm-Kennedy, G. Domingo, and W. Kingsley. Aug 75, 61p Rept no. UCLA-ENG-7550 ECOM-73-0306-3
Contract DAAB07-73-C-0306
See also report dated Jan 75, AD-A008 045.

Descriptors: *Silicon, *Semiconductor devices, *Trapping(Charged particles), Schottky barrier devices, Sulfur, Semiconductor doping, Zinc, Cobalt, Nickel, Impurities, Semiconductor diodes, Semiconductor junctions, Energy bands, Electrical resistivity, Temperature.
Identifiers: *Field induced trapping, *Schottky diodes, Charge storage.

Various multivalent dopants were investigated with the goal of obtaining nonvolatile multilevel memory devices in silicon using the Field Induced Trapping (FIT) effect. The test structures included Schottky diodes and resistive bars fabricated in silicon substrates suitably doped with multivalent dopants. Novel device effects were observed and are described. A model for a negative differential resistance Schottky barrier oscillator is proposed.

AD-A016 947/4GA PC$6.25/MF$2.25
Cornell Univ Ithaca N Y
Advanced Concepts of Microwave Generation and Control in Solids.
Biannual rept. no. 2, 1 May-31 Oct 74,
G. C. Dalman, L. F. Eastman, C. A. Lee, and J. Frey. Sep 75, 169p RADC-TR-75-177
Contract F30602-74-C-0001
See also report dated Feb 74, AD-777 815.

Descriptors: *Microwave oscillators, *Solid state electronics, *IMPATT diodes, *Semiconductor devices, Microwave amplifiers, Semiconducting films, Gunn diodes, Gallium arsenides, Epitaxial growth, Avalanche diodes, TRAPATT devices, Ion implantation, Beam leads, Field effect transistors, Microwave equipment.
Identifiers: Transferred electron devices.

The emphasis of the investigation is centered on studies of active microwave effects in avalanche diodes, transferred electron diodes, microwave field-effect transistors, and on related microwave circuit, materials growth, and physical electronic techniques. In Section A, a report is made on the microwave solid state devices and circuits. Included are: Amplifier Properties; IMPATT Diode Load Characteristics; Interaction of Distributed IMPATT Oscillators; An IMPATT Diode Characterization; Microwave Transistor Studies; Compound Semiconductor Transistor Study; Computer Experiments in TRAPATT Diodes; and High Performance TEO. In Section B, a report is made on materials and fabrication techniques. The topics discussed are: The Epitaxial Growth of Thin GaAs Layers; Read Structures; and Electric-Current-Controlled Liquid Phase Epitaxial Growth of GaAs.

AD-A016 956/5GA PC$3.25/MF$2.25
Gudeman Corp Chicago Ill
Production Engineering Measure for Polysulfone Capacitors for Short Intrusion Proximity Fuze.
Quarterly rept. no. 4, 24 Feb-24 May 75,
Frank A. Lakowski. 20 Jun 75, 18p Rept no. CSO-705-4
Contract DAAB07-74-C-0337
See also report dated Mar 75, AD-A014 167.

Descriptors: *Thin film capacitors, Production engineering, Proximity fuzes, Sulfones, Acceptance tests.
Identifiers: *Production engineering measures.

The object of the production engineering measure is to provide the production engineering necessary to improve the production process techniques of non-metal cased polysulfone capacitors used for short intrusion proximity fuzes. Capacitors are to be capable of meeting the requirements of SCS442 and MIL-C-55514 and are to attain a failure rate of 1% per 1000 hours at 90% confidence level at rated voltage at 85C. A quantity of 205 capacitors each of the .56, .1 and 2 UF First Test Articles were manufactured for official qualification and Gun Shock Test. One hundred twenty two (122) capacitors each of the above values satisfactorily completed the Official Qualification tests of Group I of Table X of MIL-C-55514A.

AD-A016 976/3GA PC$3.75/MF$2.25
RCA Corp Burlington Mass Government Communications and Automated Systems Div
Manufacturing Methods and Technology Program Automated Image Device Evaluator (AIDE).
Quarterly progress rept. no. 6, 1 Apr-30 Jun 75,
E. W. Ketler. 30 Jun 75, 33p
Contract DAAB05-74-C-2524
See also report dated 31 Mar 75, AD-A014 064.

Descriptors: *Test equipment, *Image intensifiers(Electronics), Automation, Acceptance Tests.
Identifiers: Automated image device evaluators.

The purpose of this contract is to establish a manufacturing method and technology program for an Automated Image Device Evaluator (AIDE) which will provide a computer controlled test system capable of performing production acceptance testing of second generation image intensifier tubes at the manufacturer's plant. The report covers the work performed on the AIDE equipment task during the period 1 April - 30 June 1975. It presents a technical and physical description of the Development Model equipment design and configuration.

COM-75-50620/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
On the Determination of the Minority Carrier Lifetime from the Reverse Recovery Transient of pnR Diodes.
Final rept.,
David C. Lewis. 1975, 5p
Pub. in Solid-State Electronics, v18 p87-91 1975.

Descriptors: *Semiconductor diodes, Recombination reactions, Reliability(Electronics), Mathematical models.
Identifiers: Reprints, *Minority carrier lifetime, *Carrier lifetime.

The determination of the minority carrier lifetime of pn diodes with recombination (R) contacts is discussed. It is confirmed that the base transit time of diodes with sufficiently small base widths (less than approximately three minority carrier diffusion lengths) affects the reverse recovery transient and that large error can be introduced if the minority carrier lifetime of a diode with a small base width is computed using an expression which was derived for diodes with an infinite base width. A procedure is described which can be used to compute the minority carrier lifetime of pnR diodes in which the ratio of the base width to the minority carrier diffusion length is larger than some small number. The applicability of the procedure and the approximations which are developed are a function of the ratio of the diode base width to the minority carrier diffusion length, and the forward to reverse current ratio at which the experimental measurements are made.

N75-31346/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Design and Development of a 5 Kv Isolated Solid State Switch.
R. J. Holbrook, R. Y. Scapple, F. Z. Keister, and S. T. Gooder. Feb 75, 11p
Conf-Presented at the 25TH Electron. Components Conf.

Descriptors: *Hybrid circuits, *Microelectronics, *Switching circuits, Electronic packaging, Solar arrays, Solar cells.

For abstract, see STAR 1322

N75-31347/8GA PC$3.75/MF$2.25
AEG-Telefunken, Ulm (West Germany). Fachbereich Roehren.
Cathode Ray Tubes of High Resolution Hochaufloesende Elektronenstrahlroehren.
Final Report, 1 Apr. 1971 - 31 Dec. 1972.
P. Schackert, and P. Beisse. Apr 75, 50p BMFT-FB-T-75-03
Subm-Sponsored by Bundesmin. Fuer Forsch. U. Technol.
In German; English Summary.

Descriptors: *Cathode ray tubes, *Flying spot scanners, *High resolution, Aluminum, Beam currents, Crossed field guns, Electron guns, Foils (Materials), Phosphors.

For abstract, see STAR 1322

N75-31349/4GA PC$4.75/MF$2.25
Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.
Development of New Technologies in the 100 Ghz Range Entwicklung Neuer Technologien im 100 Ghz-Bereich.
Final Report.
E. Glass, J. Hammerschmitt, and K. H. Zschauer. Apr 75, 91p BMFT-FB-T-75-04
Subm-Sponsored by Bundesmin. Fuer Forsch. U. Technol.
In German; English Summary.

Descriptors: *Air pollution, *Avalanche diodes, *Exhaust gases, *Microwave oscillators, *Spectroscopic analysis, Gallium arsenides, Ion implantation, Silicon, Solid state devices.

For abstract, see STAR 1322

N75-31421/1GA PC$3.75/MF$2.25
Centre National de la Recherche Scientifique, Verrieres-le-Buisson (France). Service Technologie Spatiale.
Storage Imaging Detector (Esid).
P. Balaskovic, and J. Denis. Jan 75, 47p ESRO-CR-40
Contract ESTEC-1038/70
In French; English Summary.

Descriptors: *Data storage, *Image dissector tubes, *Return beam vidicons, Aerospace environments, Color centers, Component reliability, Ferroelectricity, Image orthicons, Solid state devices, Technology assessment.

For abstract, see STAR 1322

PAT-APPL-482 308/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Low Distortion, Amplitude Stable Quadrature Oscillator.
Patent Application,
Alan J. Testani. Filed 24 Jun 74, 7p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Voltage controlled oscillators, Patents, Distortion, Stabilization, Voltage regulation, Oscillators.
Identifiers: *Patent applications, PAT-CL-331-109.

The patent application describes a quadrature oscillator provided with a device which senses the output of the oscillator and compares it with a precision reference voltage to thereby obtain a signal which is used as the supply voltage provided to the integrating stages of the oscillator. By so controlling the supply voltage, the output of the oscillator is automatically amplitude stabilized and distortion is reduced.

PATENT-3 822 086 Not available NTIS
Department of the Navy Washington D C
Apparatus for Recharging A TR Tube.
Patent,
Sungik F. Paik. Filed 1 Feb 73, patented 2 Jul 74, 4p Rept nos. PAT-APPL-328 828,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Transmit receive tubes, *Patents, Pressurization, Pressure regulators, Hydrogen.
Identifiers: PAT-CL-316-28.

The patent relates to a hydrogen gas reservoir outside main discharging chamber of a transmitter-receiver tube which is allowed to leak hydrogen at a controlled rate through a palladium window in the envelope of the TR tube. An automatic pressure controlling unit is provided which comprises an electrical bridge circuit with a pressure sensing element in one arm of the bridge. An imbalance in the bridge circuit turns on a heater which raises the temperature of the palladium window which in turn lets hydrogen from the reservoir pass through it to recharge the TR tube.

PATENT-3 824 497 Not available NTIS
Department of the Navy Washington D C
High-Purity, Frequency-Stable, Adjustable, Wien-Bridge, Oscillator.
Patent,
Christopher B. Schwerdt. Filed 20 Jul 73, patented 16 Jul 74, 7p Rept nos. PAT-APPL-381 109,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Oscillators, *Patents, Electric bridges, Operational amplifiers, Avalanche diodes, Frequency, Stability.
Identifiers: *Wein bridge oscillators, PAT-CL-331-141.

The patent describes a high-purity, amplitude-stable, adjustable, Wien bridge oscillator using a single amplifier component and a pair of nonlinear devices. A single operational amplifier is used in place of two amplifier components. A lamp in the degenerative-feedback path provides amplitude stabilization of the output oscillations. A back-to-back zener diode in series with a resistor is connected between the inverting input of the operational amplifier and a junction between the series resistor-capacitor arm of the bridge circuit thereby extending the linear operating-frequency range of the oscillator, improving amplitude stability of the output oscillations, and preventing output D.C. drift from feeding back to the inverting input of the operational amplifier through the back-to-back zener diode.

PATENT-3 826 452 Not available NTIS
Department of the Navy Washington D C
Electrical Control Device for a Re-Entry Vehicle.
Patent,
William A. Little. Filed 25 May 73, patented 30 Jul 74, 4p Rept nos. PAT-APPL-363 905,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Deflection coils, *Patents, Plasma sheaths, Reentry vehicles, Deflection, Plasmas(Physics), Deflectors, Helixes, Rings, Electrodes, Blackout(Propagation).
Identifiers: PAT-CL-244-1-SS.

The patent describes an electron-deflection device comprising an electron gun, a Chladni deflector. The Chladni deflector is comprised of a double helix ring electrode assembly. The nose of the re-entry body is encircled by a series or plurality of ring electrodes which are alternately positively and negatively charged. Upon re-entry the plasma generated by the leading edge of the nose would be deflected away from the skin of the re-entry body. This concept would allow communication with the vehicle by external RF signals.

PATENT-3 827 002 Not available NTIS
Department of the Navy Washington D C
Tunable Electroacoustic Transducers.
Patent,
Gene Chao. Filed 18 May 73, patented 30 Jul 74, 4p Rept nos. PAT-APPL-361 699,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Electroacoustic transducers, *Patents, Acoustic waves, Surface waves, Tuning devices, Acoustic filters, Ultrahigh frequency, Semiconductor devices, Thin films, Schottky barrier devices, Varactor diodes, Cadmium sulfides.
Identifiers: *Interdigital transducers, Acoustic surface waves, PAT-CL-333-72.

The patent relates to a plurality of electroacoustic stripe electrodes formed as a thin film on the surface of a piezoelectric semiconductor slab. The electrode-semiconductor interface forms a varactor junction. By selectively interconnecting the stripes and applying bias voltages, a tunable electroacoustic transducer of UHF filter is achieved.

PATENT-3 827 023 Not available NTIS
Department of the Navy Washington D C
Piezoelectric Transducer Having Good Sensitivity Over a Wide Range of Temperature and Pressure.
Patent,
Theodore A. Henriquez, and Allan C. Tims. Filed 25 May 72, patented 30 Jul 74, 5p Rept nos. PAT-APPL-256 864,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Piezoelectric transducers, *Patents, Sensitivity, Broadband, Stability, Standards.
Identifiers: PAT-CL-340-10.

The patent describes an electroacoustic transducer wherein the sensing elements comprise a radially polarized ceramic cylinder having annular rings attached to the ends of the ceramic cylinder and a cylindrical insert, centered in said cylinder, is sealed by O rings between the insert and the annular rings. A pair of the ceramic cylinders are connected electrically to form an assembly. The assembly is mounted by rubber mounts in a frame which is surrounded by an expanded metal electrostatic shield. The whole assembly is enclosed within a castor oil filled butyl boot. The assembly has good sensitivity over a wide frequency range.

PATENT-3 831 044 Not available NTIS
Department of the Navy Washington D C
Coded Grating Transducer.
Patent,
Jeffrey M. Speiser. Filed 7 Nov 73, patented 20 Aug 74, 8p Rept nos. PAT-APPL-413 485,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Transducers, *Patents, Coding, Gratings(Spectra), Surface waves, Acoustic waves, Filters, Transverse, Acoustic delay lines, Arrays, Signal processing.
Identifiers: Acoustic surface waves, PAT-CL-310-9-8, Convolvers.

This invention relates to a high-impedance coded transducer for use in acoustic surface wave devices, including transversal filters, broadband delay lines, and cross-convolvers.

PATENT-3 906 231 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, Calif.
Doped Josephson Tunneling Junction for Use in a Sensitive IR Detector.
Patent.
M. M. Saffren. Patented 16 Sep 75, 12p PAT-APPL-452 770
Misc-Filed 19 Mar. 1974 Supersedes N74-20022 (12 - 11 p 1291). Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of patent available from Commissioner of Patents, Washington, D.C. 20231 $.50.

Descriptors: *Electron tunneling, *Infrared detectors, *Josephson junctions, *Superconductivity, Equipment specifications, *Patents, Remote sensors, Semiconductors (Materials).
Identifiers: PAT-CL-250-238.

A superconductive tunneling device having a modified tunnel barrier capable of supporting Josephson tunneling current is provided. The tunnel barrier located between a pair of electrodes includes a molecular species which is capable of coupling incident radiation of a spectrum characteristic of the molecular species into the tunnel barrier. The coupled radiation modulates the known Josephson characteristics of the superconducting device. A superconductive tunneling device can be tuned or made sensitive to a particular radiation associated with the dopant molecular species. Semiconductor material can be utilized as the molecular species to provide an increased selective bandwidth response. Appropriate detector equipment is utilized to measure the modulation of any of the Josephson characteristics such as critical current, voltage steps, Lambe-Jaklevic peaks and plasma frequency.

PATENT-3 906 296 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, Calif.
Stored Charge Transistor.
Patent.
J. Maserjian, and G. W. Lewicki. Patented 16 Sep 75, 12p PAT-APPL-174 684
Misc-Filed 25 Aug. 1971 Supersedes N73-30974 (11 - 22, p 2617). Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of patent available from Commissioner of Patents, Washington, D.C. 20231 $.50.

Descriptors: *Electrical insulation, *Energy storage, *Field effect transistors, Equipment specifications, *Patents, Sandwich structures, Silicon nitrides, Silicon oxides, Thin films.
Identifiers: PAT-CL-357-7.

A stored charge device of the general type designated as an MNOS field-effect transistor, has its operation improved by embedding a thin metal layer between two insulating films used in the transistor. The embedded metal layer technique is used to provide a two-terminal thin-film stored charge device, consisting of a metal-insulator-embedded-metal-insulator-metal, sandwich structure which can be used in high-density memory arrays.

9B. Computers

AD-A016 287/5GA PC$4.75/MF$2.25
Desmatics Inc State College Pa
Automated Response Surface Methodology in Digital Computer Simulation. Volume II. Program Flowcharts and Listings.
Technical rept.,
Dennis E. Smith. Sep 75, 86p Rept no. TR-101-2
Contract N00014-74-C-0148
See also Volume 1 dated Sep 75, AD-A016 286.

Descriptors: *Digital simulation, *Computer programs, Subroutines, Monte Carlo method, FORTRAN, Interfaces.
Identifiers: IBM 370/168 computers, FORTRAN H programming language, Response surface analysis.

A modular computer program based on the statistical techniques of Response Surface Methodology has been developed to conduct the task of seeking optimum solutions to problems being simulated on a digital computer. The program, which may be used for constrained or unconstrained optimum-seeking in conjunction with deterministic or Monte Carlo simulations, is now available to potential users. The first volume of this report describes the program and serves as a user's guide. This report volume contains program flowcharts and listings.

AD-A016 302/2GA PC$6.25/MF$2.25
Massachusetts Inst of Tech Cambridge Project Mac
Semantics of Communicating Parallel Processes.
Doctoral thesis,
Irene Greif. Sep 75, 165p Rept no. MAC-TR-154
Contract N00014-75-C-0522

Descriptors: *Parallel processing, *Programming languages, *Semantics, Multiprocessors, Mathematical logic, Data bases, Synchronism, Computations, Theses.
Identifiers: Semaphores, Computer Networks, Axioms, MAC project.

The theme of this report is that an understanding of the ordering constraints that are introduced among events of parallel processes is essential to the understanding of synchronization and that therefore any language for specifying synchronization of parallel processes should be based on a theory of such orderings. While it is possible to write specifications for systems of communicating parallel processes by reference to the time ordering of some global clock external to the system, such specifications cannot be as useful as one which are in terms of orderings derivable within the system. Specifications should place constraints on intended behavior of the computer system itself rather than on the possible observations of the system's behaviors from some global viewpoint which may in fact be totally unrealizable. The dissertation is a development of a specification language. It is based on a model of computation in which an individual process is represented by a totally ordered set of events.

AD-A016 306/3GA PC$5.75/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
The Interface Message Processor Program.
Sep 75, 132p Rept no. Technical Information-89-Rev
Contracts DAHC15-69-C-0179, F08606-75-C-0032
Supersedes report dated Jun 75, AD-A012 811. Sponsored in part by Contract F08606-73-C-0027.

Descriptors: *Communications networks, *Computer programming, Message processing, Time sharing, Control sequences, Memory devices.
Identifiers: *ARPA computer network, *Computer networks, *Interface message processors, IMP(Interface Processor Processors), Protocols, Data structures, Packet communications.

The ARPA Network has been in operation for over five years and has become an international facility. The network has grown to more than 60 sites spread across the continental United States, plus satellite connections to Hawaii, Norway, and England, and is steadily growing; approximately ninety independent computer systems of varying manufacture are interconnected. Provision has been made for terminal access to the network from sites which do not enjoy the ownership of an independent computer system. Implementation of the IMPs required the development of a sophisticated computer program. This program has been previously described in previous papers. As stated then, the principal function of the IMP program is the processing of packets, including the following: segmentation of Host messages into packets; receiving, routing, and transmitting store-and-forward packets; retransmitting unacknowledged packets; reassembling packets into messages for transmission into a Host; and generating RFNMs and other control messages. The program also monitors network status, gathers statistics, and performs on-line testing.

AD-A016 347/7GA PC$4.25/MF$2.25
Wisconsin Univ Madison Mathematics Research Center
Data Models for Secondary Storage Representations.
Summary rept.,
Allen Reiter. Jul 75, 64p Rept no. MSR-TSR-1554
Contract DA-31-124-ARO(D)-462

Descriptors: *Data management, *Data bases, Data storage systems, Memory devices, Mathematical models, Theorems.
Identifiers: Data structures, *Data management systems.

Performance modelling of data base management systems, and in particular data base models capable of describing representation features in secondary storage, are discussed. Data structures relevant for secondary storage representations are defined, and a partial characterization of several actual systems is given. The accent is on the use of these structures in the context of a simulation model.

AD-A016 399/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Advanced Electronic Technology.
Quarterly technical summary 1 May-31 Jul 75,
Melvin A. Herlin, and Alan L. McWhorter. 24 Sep 75, 20p ESD-TR-75-246
Contract F19628-76-C-0002
See also report dated 15 May 75, AD-A012 734.

Descriptors: *Digital computers, *Integrated circuits, *Solid state electronics, Analog to digital converters, Quantum electronics, Microelectronics, Semiconductor lasers, Infrared lasers, Gallium arsenides, Laser materials, Thin films.

Contents: Data systems (Digital computers, Processor and education technology, Computer systems); Solid state (Solid state device research, Quantum electronics, Materials research, Microelectronics).

AD-A016 401/2GA PC$5.25/MF$2.25
Mitre Corp Bedford Mass
Software Acquisition Management Guidebook: Regulations, Specifications and Standards,
J. T. Connolly. Oct 75, 121p Rept no. MTR-3080 ESD-TR-75-91
Contract F19628-75-C-0001

Descriptors: *Management, *Computer programming, *Acquisition, Military requirements, Air Force, Standards, Specifications.

Regulations, specifications and standards pertinent to Air Force software acquisition are identified and categorized by management and software development tasks required during a system acquisition. The place of software development in a system life cycle and the two principal Air Force management regulations impacting on software acquisition are discussed. Brief summaries of regulations, specifications and standards, and keyword cross-reference lists are included for selected documents.

AD-A016 403/8GA PC$4.25/MF$2.25
Mitre Corp Bedford Mass
Jobstream Separator System Design,
J. M. Schacht. Sep 75, 52p Rept no. MTR-3022-Vol-1 ESD-TR-75-86
Contract F19628-75-C-0001

Descriptors: *Data processing security, Minicomputers, Switching circuits, Time sharing, Cost estimates.
Identifiers: Operating systems(Computers).

The Jobstream Separator (JSS) has been proposed to automate the costly, inefficient, and inconvenient manual process used to 'change colors' (security levels) at AF WWMCCS sites. The JSS would provide complete isolation among WWMCCS users and data at differing levels by introducing a secure, centralized, certifiably correct, minicomputer system to control electronic switching of peripheral devices during the system reconfiguration phase of the color change. The system would eliminate extensive operator intervention, reduce the delays incurred in the physical removal of storage media, and enable the operator to change security states while maintaining overall security. This report presents a technical and economic assessment of the JSS and recommends development of the prototype system.

AD-A016 404/6GA PC$4.75/MF$2.25
Mitre Corp Bedford Mass
Remote-Terminal Emulator (Design Verification Model)--Data Structures, Scenario Instructions and Commands,
D. L. James. Oct 75, 87p Rept no. MTR-2677-Vol-2-Rev-1 ESD-TR-74-115-Rev
Contract F19628-75-C-0001
Supersedes rept. no. Mitre-MTR-2677-Vol-2 dated May 74, AD-781 180. Supersedes rept. no. ESD-TR-74-115 dated May 74.

Descriptors: *Remote terminals, *Minicomputers, *Computer programming, On line systems, Real time.
Identifiers: Data structures, NOVA 800 minicomputers, *Remote terminal emulator, Computer performance evaluation.

The Remote-Terminal Emulator is a minicomputer-based system which generates message traffic for use in testing and evaluating large-scale multi-terminal computer systems. This series of reports describes the two Design Verification Models that were developed on Data General NOVA 800 minicomputers. This volume (revised to reflect expansions in emulator capability made since late 1973) describes the global data structures of the emulator and also defines the log tape format, scenario instruction types available, and the commands recognizable in real-time. Scenario instructions are used to construct scenarios which are the common denominator linking the real-time and non-real-time programs of the Remote-Terminal Emulator. Scenarios are programs which determine the specific actions to be taken by the emulator in real-time in emulating the behavior of terminals and operators and in controlling the run.

AD-A016 414/5GA PC$5.25/MF$2.25
IBM Federal Systems Div Gaithersburg Md
Structured Programming Series. Volume VII. Documentation Standards. Addendum.
Final technical rept.,
Martha S. Bennett, Samual W. Hughes, Louis H. Ortega, and Wayne H. Richards. 15 Apr 75, 116p RADC-TR-74-300-Vol-7-Add
Contract F30602-74-C-0186
Addendum to Volume 7, AD-A008 639. See also Volume 8, AD-A016 415.

Descriptors: *Computer programming, Data management, Computer logic, Military requirements, Standards, Documents, Computer program documentation, Flow charting, Programming languages, Instruction manuals.
Identifiers: *Structured programming, Computer software.

This report is an addendum to Documentation Standards Final Report, Volume 7 of the Structured Programming Series. This report presents the results of a study to determine the impact of structured programming technology on Army documentation standards. Changes are recommended to AR 18-1 and USACSC Manuals 18-1 and 18-100 to permit their use by projects using both tragitional structured programming development methods. (Author)

AD-A016 415/2GA PC$4.25/MF$2.25
IBM Federal Systems Div Gaithersburg Md
Structured Programming Series. Volume VIII. Program Design Study.
Final technical rept.,
Thomas M. Kraly, John J. Naughton, Ronald L. Smith, and Nathan Tinanoff. 30 May 75, 71p RADC-TR-74-300-Vol-8
Contract F30602-74-C-0186
See also Volume 7, AD-A016 414 and Volume 9, AD-A008 640.

Descriptors: *Computer programming, Programming languages, Flow charting, Machine coding, Subroutines, Symbols.
Identifiers: *Structured programming, Design, Computer software.

This volume reports on program design tools and techniques. It evaluates these tools and techniques determining their relationship to structured programming technology and presents their advantages and disadvantages. The major conclusion of this report is that program design languages, as well as detailed flowcharts, facilitate expression of program control flow but the former is more easily produced and maintained at less expense. (Author)

AD-A016 416/0GA PC$4.25/MF$2.25
IBM Federal Systems Div Gaithersburg Md
Structured Programming Series. Volume XI. Estimating Software Project Resource Requirements.
Final technical rept.,
Ronald L. Smith. 22 Jan 75, 67p RADC-TR-74-300-Vol-11
Contract F30602-74-C-0186
See also Volume 10, AD-A008 861.

Descriptors: *Computer programming, *Computer program documentation, Costs, Estimates, Military requirements, Data management, Technology, Literature surveys.
Identifiers: *Structured programming, *Computer software, Design.

This report contains an analysis of techniques currently used for estimating software resource requirements and addresses the effect structured programming technology will have on these techniques. Techniques addressed cover all phases of software development - definition, design, implementation, and evaluation. (Author)

AD-A016 421/0GA PC$4.75/MF$2.25
David W Taylor Naval Ship Research and Development Center Bethesda Md Central Instrumentation Dept
Eight Channel Portable Data Acquisition System (SESPODAS),
Robert D. Pierce, and Glenn Friedenreich. Aug 75, 81p Rept no. CID-29-3

Descriptors: *Data acquisition, *Ship motion, *Seakeeping, Portable equipment, Motion, Measurement, Pulse code modulation, Instrumentation, Roll, Pitch(Motion), Heaving, Acceleration, Surges, Yaw, Audio frequency, Transducers, Recording systems, Systems analysis, Installation, Operation, Maintenance, Diagrams.
Identifiers: *SESPODAS Data Acquisition system.

A portable data acquisition system was developed to record eight channels of model or full scale naval craft motion data. Six of the eight channels are dedicated to record roll angle, pitch angle, heave acceleration, surge acceleration, and sway acceleration signals provided by the system's transducers, and audio information (voice). Signals from two additional transducers, one of which can be the yaw rate signal provided by the system, can be recorded on the two remaining channels. This report discusses the system's features and installation, operation and maintenance procedures. (Author)

AD-A016 423/6GA PC$4.75/MF$2.25
Rand Corp Santa Monica Calif
Computers and Strategic Advantage: I. Computer Technology in the United States and the Soviet Union.
Interim rept.,
R. Turn, and A. E. Nimitz. Jul 75, 76p Rept no. R-1642-PR
Contract F44620-73-C-0011
Errata sheet inserted.

Descriptors: *Computer architecture, *Technology, State of the art, United States, USSR, Comparison, Integrated circuits, Memory devices, Computers, Manufacturing, Industrial production, Minicomputers, High rate, Data processing equipment, Military forces(Foreign), Military forces(United States), Computer applications, Efficiency, Military applications, Technology transfer.
Identifiers: *Computer software, *Computer hardware.

This report is one in a series of three reports that collectively examine U.S. competition with the Soviet Union in computer technology and the military advantages that the United States may achieve by virtue of superior computer technology. The present status and expected future developments in computer technology in the two countries are compared. It is concluded that although the Soviet Union lags the United States by at least five years in the capability to manufacture integrated circuits, computer systems, storage devices, and peripheral equipment, the rate of development of Soviet computer technology is high and could be further accelerated by transfer to the Soviet Union of Western technology and know-how. The relationship between computer technology and military capabilities, and the exploitation of the U.S. advantage in computer technology are further explored in R-1643-PR and R-1644-PR.

AD-A016 431/9GA PC$10.00/MF$2.25
Michigan Univ Ann Arbor Systems Engineering Lab
Optimal Data Base Schema Design.
Interim rept. Jul 72-Jun 75,
Michael F. Mitoma. Aug 75, 354p RADC-TR-75-175
Contract F30602-73-C-0001

Descriptors: *Data bases, *Optimization, *Data management, On line systems, Information systems, Computer programming, Dynamic programming, Integer programming, Mathematical models.
Identifiers: Schema theory, Data management systems.

This report describes a methodology that will automate and optimize the logical structure of a data base for the application that it supports. The methodology consists of three mathematical models and an automated design procedure. A case study analysis is presented and a number of optimal data bases are generated and discussed.

AD-A016 434/3GA PC$5.75/MF$2.25
Syracuse Univ N Y Dept of Electrical and Computer Engineering

Identification of Three-Dimensional Aircraft by their Two-Dimensional Optical Images.
Final technical rept. Apr 73-May 75,
Ming-Kuei Hu, and Kuo-Pin Wang. Aug 75, 128p
RADC-TR-75-201-Vol-I
Contract F30602-73-C-0261

Descriptors: *Image processing, *Pattern recognition, Aircraft, Optical images, Transformations(Mathematics), Algorithms, Computations, Computerized simulation.
Identifiers: Method of moments.

To identify three-dimensional objects by their two-dimensional images (projections), the number of samples required is, in general very large. Using two-dimensional canonical affine moments, the number of samples can be considerably reduced. This report studies the application of canonical affine moment to the three-dimensional aircraft identification problem. A simulation program based on this method is included. The primary results of using only a few samples have shown the theoretical and practical usefulness of this method.

AD-A016 436/8GA PC$5.25/MF$2.25
Pattern Analysis and Recognition Corp Rome N Y
RADC On-Line Retrieval System Evaluation.
Final rept. Jul 73-Mar 75,
John M. Morris, Clifford Carroll, and Richard Jayne. Aug 75, 115p Rept no. PAR-75-10 RADC-TR-75-208
Contract F30602-73-C-0389

Descriptors: *Information systems, *Information retrieval, On line systems, Documents, Data bases, Performance, Mathematical models, Statistical analysis, Computer programming.
Identifiers: *RADCOL system, SMART system, Performance evaluation.

This report presents the results of comprehensive statistical and operational testing of the RADCOL retrieval system. Section 1 of the report presents an overview of the system, with emphasis on retrieval methodology, and with some discussion of the effectiveness of this methodology. Section 2 describes the techniques for statistical testing which were developed especially for this project. They permit objective tests of retrieval effectiveness for large data bases, which may not permit a complete search to determine the number of documents relevant to a particular query. Section 3 presents the results of operational testing of the RADCOL system. In Section 4, the RADCOL system is compared with several standard retrieval systems, in an attempt to determine those features that might be most useful in future development of the system. Section 5 presents a more detailed discussion of possible modifications and expansions of the system, as it might be implemented in an operational environment.

AD-A016 438/4GA PC$8.75/MF$2.25
Honeywell Information Systems Inc Mclean Va
TPAP Operating System Executive.
Final rept. Sep 74-Jun 75,
R. Ewing. Aug 75, 277p RADC-TR-75-212
Contract F30602-74-C-0138

Descriptors: *Information systems, *Computer applications, Computer programming, Message processing, Queueing theory, Scheduling, Allocations, Real time, On line systems.
Identifiers: TPAP system, *Operating systems(Computers), Honeywell 600/6000 computers, Keyword processors.

This report describes a special purpose, virtual operating system designed to enhance the flexibility and capability of the Transaction Processing System within the Honeywell Series 60/6000/600 Information Systems. The special purpose operating system is called the TPAP Operating System (TPOS). The TPOS was developed as a specialized software system that virtually controls an assigned subset of the total computer environment for the exclusive multiprogrammed execution of a selected set of Transaction Processing Applications Programs. Functionally, the TPOS resembles a time sharing system. More than one TPOS can be incorporated in a Transaction Processing System. The report includes the user, site and program logic documentation. The user and site guidelines are provided to install and use a TPOS. The program logic sections document design objectives and techniques, modular structure and control table definitions of the TPOS Executive program.

AD-A016 467/3GA PC$4.25/MF$2.25
Mitre Corp Bedford Mass
A General Security Marking Policy for Classified Computer Input/Output Material,
J. Mogilensky. Sep 75, 62p Rept no. MTR-3024 ESD-TR-75-89
Contract F19628-75-C-0001

Descriptors: *Data processing security, Input output processing, Classified materials, Information processing.
Identifiers: Computer information security, Computer privacy.

A security marking policy has two objectives: (1) to fulfill the basic marking requirements of the security regulations for all types of computer I/O material on a consistent, generalized basis, and (2) to ensure that the security attributes of classified data are accurately maintained on every I/O transfer. The reasons behind the need for a general policy are considered, the guidance provided by existing regulations is reviewed, and the marking policies of three existing systems are outlined. The basic concept of multilevel I/O is defined. a set of groups of I/O techniques is established, and two distinct marking policies, one for unilevel I/O and one for multilevel, are presented. Finally, an overview of the considerations involved in the implementation of trustworthy computer labeling is provided.

AD-A016 476/4GA PC$4.75/MF$2.25
Mitre Corp Bedford Mass
Remote-Terminal Emulator (Design Verification Model)--Scenario Assembler,
T. Suyemoto Paster. Oct 75, 90p Rept no. MTR-2677-Vol-4-Rev-1 ESD-TR-73-293-Rev
Contract F19628-75-C-0001
Supersedes rept. Mitre-MTR-2677-Vol-4 dated Dec 73, AD-772 820. Supersedes rept. no. ESD-TR-73-293 dated Dec 73.

Descriptors: *Minicomputers, *Remote terminals, *Computer programming, Compilers, On line systems, Instruction manuals.
Identifiers: *Remote terminal emulator, NOVA 800 minicomputers, Computer performance evaluation, Assembler routines.

The Remote-Terminal Emulator is a minicomputer-based system which generates message traffic for use in testing and evaluating large-scale, multi-terminal computer systems. This series of reports will describe the two Design Verification Models that were developed on Data General NOVA 800 minicomputers.

AD-A016 482/2GA PC$12.00/MF$2.25
Texas Instruments Inc Dallas
Distributed Processor/Memory Architectures Design Program.
Final rept. 10 Dec 73-7 Dec 74,
G. Consolver, D. Ackley, M. Rickard, R. McAfee, and T. Shipchandler. Feb 75, 500p AFAL-TR-75-80
Contract F33615-74-C-1018

Descriptors: *Avionics, *Computer programming, *Central processing units, Memory devices, Computer architecture, Logic circuits, Shift registers, Interfaces, Computerized simulation, Data bases, Computer programs, FORTRAN.
Identifiers: Distributed computer systems, Computer networks, Fault tolerant computing.

The purpose of Distributed Processor/Memory Architecture (DP/M) design program was to extend the DP/M avionic system processing concept to a detailed system hardware and software design. The functional design for the DP/M Processing Element (PE) is summarized, including the processor, memory, input/output interface, and a dual-level time-division-multiplex bus interface unit. A set of simulation and analysis programs was developed for modeling both the high-level network interaction among interconnected Processing Elements and the detailed internal operation of the PE. Other major areas examined were the executive control software, the process construction methodology required to develop and allocate real-time software for DP/M, and methods that could be used with DP/M to promote avionic system fault tolerance.

AD-A016 488/9GA PC$5.25/MF$2.25
Mitre Corp Bedford Mass
An Air Force Guide for Monitoring and Reporting Software Development Status,
S. R. Hagan, and C. W. Knight. Sep 75, 101p
Rept no. MTR-3051 ESD-TR-75-85
Contract F19628-75-C-0001
Report in the Software Acquisition Management Guidebook Series.

Descriptors: *Computer programming, *Management planning and control, Cost estimates, Data management, Programming languages, Monitoring, Air Force.
Identifiers: Project management.

This guidebook is one in a series covering important aspects of software acquisition management. It is intended for managers and technical personnel engaged in, or planning for, the monitoring and reporting of the technical status of a software development project. The guidebook explains the principal status monitoring tools such as milestone management, status meetings, reports, and interviews. Status estimating techniques are discussed, as is contractual planning for ensuring government visibility.

AD-A016 493/9GA PC$3.25/MF$2.25
Rand Corp Santa Monica Calif
Privacy and Security in Computer Systems,
R. Turn, and W. H. Ware. Jan 75, 25p Rept no. P-5361

Descriptors: *Data processing security, Time sharing, On line systems, Information processing, Computer programming, Coding, Cryptography.
Identifiers: *Computer privacy, *Computer information security, Personal privacy, Confidential information.

This paper presents a broad overview of the three topics important in the design, operation, and use of computerized information systems and personal information databanks: safeguarding of individual rights of data subjects; providing confidentiality to identifiable personal information in statistical and research-oriented information systems; and, protecting computer resources and data files against unauthorized use by maliciously-inclined insiders or by intruders from outside.

AD-A016 577/9GA PC$10.25/MF$2.25
Network Analysis Corp Glen Cove N Y

The Practical Impact of Recent Computer Advances on the Analysis and Design of Large Scale Networks.
Semiannual technical rept. no. 3B,
Howard Frank. Jun 74, 384p
Contract DAHC15-73-C-0135, ARPA Order-2286
See also report dated Dec 73, AD-777 738.

Descriptors: *Communications networks, Data processing terminals, Interactive graphics, Radio broadcasting, Switching circuits, Computations.
Identifiers: *Computer networks, *ARPA computer networks, Packet communications, Network analysis theory, Branch and bound method.

New results on the following major questions are reported: A network design algorithm using cut saturation with multicapacity links for distributed packet switched networks; An algorithm for optimizating terminal processor locations in terminal oriented systems; A branch and bound approach to network design; A system for large scale computations and the impact of interactive graphics on network design; Simulation of Packet Radio Networks; network capacity tradeoffs and channel configurations for packet radio system, and algorithms for repeaters location for line of sight area coverage.

AD-A016 578/7GA PC$5.75/MF$2.25
Network Analysis Corp Glen Cove N Y
The Practical Impact of Recent Computer Advances on the Analysis and Design of Large Scale Networks.
Semiannual technical rept. no. 4B,
Howard Frank, and Richard Van Slyke. Dec 74, 133p
Contract DAHC15-73-C-0135, ARPA Order-2286
See also report dated Jun 74, AD-A016 577.

Descriptors: *Communications networks, Data transmission systems, Switching circuits, Communication satellites, Radio broadcasting, Topology, Network flows, Reliability(Electronics), Redundancy, Cost analysis.
Identifiers: *Computer networks, Network analysis theory, Distributed computer systems, Packet communications.

This report summarizes studies of local, regional, and large scale data communication network problems. Primary emphasis is placed on system issues and tradeoffs. Areas discussed are packet radio system studies, packet radio system algorithms and control, local and regional data network cost comparisons and alternatives, and integrated large scale packet switched network cost and performance. Studies of multidropped, point-to-point, and broad band cable and radio broadcast systems as well as the impact of satellites on network cost and performance are described.

AD-A016 653/8GA PC$5.75/MF$2.25
New York Univ Bronx Computer Research Lab
SYNTHESIS: A Program for Generating Pictures.
Technical rept.,
Margaret E. Kepner. Jul 75, 126p Rept no. CRL-41
Contract N00014-75-C-0572

Descriptors: *Pattern recognition, *Image processing, Computer programming, Linguistics, Syntax.
Identifiers: *SYNTHESIS computer program, Picture processing, Parsing.

SYNTHESIS, an experimental program for the generation of pictures based on linguistic models, is described. This program allows a user to specify a picture grammar interactively and to display the associated picture elements. The program execution and organization are explained, and the data structure is presented. Some of the strengths and weaknesses of SYNTHESIS are discussed and directions of possible expansion are suggested.

AD-A016 662/9GA PC$4.75/MF$2.25
University of Southern California Marina Del Rey Information Sciences Inst
A Research Program in Computer Technology.
Annual rept. 17 May 74-30 Jun 75.
Sep 75, 99p Rept no. ISI/SR-75-3
Contract DAHC15-72-C-0308, ARPA Order-2223
See also report dated May 74, AD-784 135.

Descriptors: *Computer applications, Scientific research, Computer programming, Communications networks, Computer graphics, Data processing security, Microprogramming, Secure communications.
Identifiers: Computer program verification, ARPA computer network, TENEX system, Automatic programming, Computer information security, Computer networks.

This report summarizes the research performed by USC/Information Sciences Institute from 17 May 1974 to 30 June 1975. The research is aimed at applying computer science and technology to problem areas of high DoD/military impact. The ISI program consists of eight research areas: Program Verification--logical proof of program validity; Programming Research Instrument--development of a major time-shared microprogramming facility; Automatic Programming--the study of acquiring and using problem knowledge for program generation; Protection Analysis--methods of assessing the viability of security mechanisms of operating systems; Information Automation--development of a user-oriented message service for large-scale military requirements; Network Secure Communication--work on low-bandwidth, secure voice transmission using an asynchronous packet-switched network; Special Projects--further development of Xerox Graphics Printer facilities; and ARPANET TENEX Service--operation of TENEX service and continuing development of advanced support equipment.

AD-A016 668/6GA PC$4.75/MF$2.25
IBM Federal Systems Center Gaithersburg Md
Structured Programming Series. Volume XV. Validation and Verification Study.
Final technical rept.,
Ronald L. Smith. 22 May 75, 89p RADC-TR-74-300-Vol-15
Contract F30602-74-C-0186
See also Volume 14, AD-A015 795.

Descriptors: *Computer programming, Validation, Test methods, Compilers, Computerized simulation.
Identifiers: *Computer program verification, *Structured programming, Computer program reliability, Computer performance evaluation.

This volume reports on techniques currently used for verifying and validating computer programs and software systems. It also contains an analysis of the effect that structured programming technology will have on these techniques. This analysis addressed all phases of software development - definition, design, implementation, and evaluation.

AD-A016 689/2GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Multichip Integrated Circuit Memory with Photoformed Plated Conductors.
Journal article,
Elis A. Guditz, and Robert L. Burke. 26 Jun 74, 9p Rept no. JA-4396 ESD-TR-75-228
Contract F19628-73-C-0002
Availability: Pub. in IEEE Transactions on Parts, Hybrids, and Packaging, vPHP-11 n2 p89-96 Jun 75.

Descriptors: *Chips(Electronics), *Integrated circuits, *Memory devices, Plastics, Nickel, Substrates, Circuit interconnections, Reprints.
Identifiers: Photoformed plated conductors.

A 20-chip integrated circuit memory has been constructed utilizing techniques of plastic embedment, photoformation of plastics, and selective electroless metal deposition previously reported. This paper is a continuation and update of that earlier work. It has been demonstrated that groups of passivated integrated circuit chips can be accurately placed in array positions, embedded in plastic, and interconnected with electroless nickel conductors deposited in photoformed multilayered conductor paths separated by selectively photoformed plastic dielectric layers. Thermal paths of nickel, plated directly to the backs of the chips and to an adhered photoetched metal substrate, effectively remove heat from the chips.

AD-A016 771/8GA PC$5.75/MF$2.25
IBM Federal Systems Center Gaithersburg Md
Structured Programming Series. Volume I. Programming Language Standards.
Final technical rept.,
Marvin M. Kessler, and Nathan Tinanoff. 15 Mar 75, 146p RADC-TR-74-300-Vol-1
Contract F30602-74-C-0186
See also Volume 4, AD-A015 794.

Descriptors: *Programming languages, Compilers, Standards, FORTRAN, Assembly languages, Computerized simulation.
Identifiers: *Structured programming, JOVIAL J73 programming language, JOVIAL J73/1 programming language, COBOL, AN/GYK-12 computer.

This report contains recommended structured programming language standards and guidelines for JOVIAL J73 and JOVIAL J73/1, JOVIAL J3, ANS FORTRAN, ANS COBOL, TACPOL and assembly languages for the S/360 and the AN/GYK-12 computers. The various language sections indicate how the recommended control logic figures may be programmed using only capabilities that are native to the languages. In addition, a more general approach to structured programming standards is described. This is based upon the development of a precompiler and suggests the use of a similar syntax for all languages.

AD-A016 780/9GA PC$5.25/MF$2.25
Naval Postgraduate School Monterey Calif
System Test Methodology. Volume I.
Technical rept.,
G. H. Bradley, G. T. Howard, N. F. Schneidewind, G. W. Montgomery, and T. F. Green. Jul 75, 119p Rept no. NPS-55SS75072A
See also reported dated Jun 75, AD-A012 461, and Volume 2, AD-A016 781.

Descriptors: *Computer programming, *Avionics, Test methods, Computerized simulation, FORTRAN, Network flows, Computations.
Identifiers: *Computer program reliability, Graph theory, Structured programming, IBM 360/67 computers.

The Naval Postgraduate School has conducted a research project during the period 30 June 1974 to 30 June 1975, entitled System Test Methodology under the sponsorship of the Naval Air Development Center. The purpose of this project was to develop a methodology for conducting system tests of avionics or other complex hardware/software systems. Two areas which received major emphasis were prototype testing and maintenance testing. A methodology for conducting prototype tests

was developed. In addition, a simulation model was prepared for aiding the designer and tester in identifying and diagnosing faults which may occur during prototype testing.

AD-A016 781/7GA MF$2.25
Naval Postgraduate School Monterey Calif
System Test Methodology. Volume II,
G. H. Bradley, G. T. Howard, N. F. Schneidewind, G. W. Montgomery, and T. F. Green. Jul 75, 119p Rept no. NPS-55SS75072B
See also Volume 1, AD-A016 780.
Availability: Available in microfiche only.

Descriptors: *Computer programming, *Avionics, Computerized simulation, Test methods, Computer programs, FORTRAN.
Identifiers: *Computer program reliability, Graph theory, Structured programming.

The report continues with Part 2 of the system test methodology including the following: Description of prototype testing simulation model; FORTRAN example program code; Directions for the use of the error simulation program; Error simulation program listing; Directions for the use of the analytical error detection model. Portions of this document are not fully legible.

AD-A016 785/8GA PC$5.25/MF$2.25
University of Southern California Marina Del Rey Information Sciences Inst
A Process Elaboration Formalism for Writing and Analyzing Programs.
Research rept.,
David Wilczynski. Oct 75, 117p Rept no. ISI/RR-75-35
Contract DAHC15-72-C-0308, ARPA Order-2223

Descriptors: *Computer programming, Writing, Debugging(Computers), Compilers, Mathematical logic, Game theory, Network flows.
Identifiers: Parsing, Automatic programming, Graph theory.

This research effort presents a formalism for writing programs which explicitly addresses and highlights some program construction issues. The formalism, a kind of production system, generates a graph that defines the process under inspection, making explicit both when and where variable bindings take place. From the standpoint of proper data structuring these extra dimensions are useful for analyzing a program, particularly with respect to ease of data access, access ambiguity, proper sequence of bindings, and other related issues. Because the formalism is a natural one for parsing a protocol of an instance of the process described by the productions, the system will be able to run in two modes: generation (to produce a behavior instance) or parse (determining whether a particular behavior instance could have been generated from a given program). Both these capabilities are important in debugging programs, especially those written in an Automatic Programming environment in which the system may be communicating with a nonprogrammer.

AD-A016 805/4GA PC$3.25/MF$2.25
Navy Personnel Research and Development Center San Diego Calif
A Comparison of Three Combinations of Text and Graphics for Concept Learning.
Technical rept. Jan 73-Dec 74,
William A. King. Sep 75, 20p Rept no. NPRDC-TR-76-16

Descriptors: *Computer graphics, *Learning, *Computer aided instruction, Visual aids, Naval training, Schools, Computer programs, Scoring, Instructions, Comprehension, Performance tests.
Identifiers: Plato 4 computer program.

A study was conducted to determine how verbal instruction could be supplemented by visuals, and in particular, how to take pedagogical advantage of the excellent capabilities of the PLATO 4 computer-based instructional system. Literature research disclosed little previous information of value on the subject. Three versions of a lesson on the sine-ratio concept were prepared, one with verbal text supplemented with animated graphics, one supplemented with still graphics, and one without graphics (text only). Forty-five students from the Basic Electrivity/Electronics School at the Naval Training Center (NTC), San Diego, were randomly assigned to the three versions. A comparison of the pretest and posttest mean scores for each group revealed learning took place in each group, and a questionnaire administered after the posttest revealed that the students gave positive ratings to the instructional materials and presentations. The groups did not differ in time required for training. On the posttest, the animated graphics group had the highest mean performance, but none of the differences between groups were significant. It was concluded that these results are consistent with previous findings suggesting that graphics are more useful for teaching concepts involving time and motion than for concepts involving space, and more useful for tasks involving stimulus identification than for tasks involving terminology or comprehension. (Author)

AD-A016 806/2GA PC$5.75/MF$2.25
Naval Research Lab Washington D C
AN/UYK-17(XB-1)(V) Signal Processing Element Microprogramming Support Software.
Interim rept.,
Tomlinson G. Rauscher, John D. Roberts, Jr., and W. David Elliott. 10 Oct 75, 126p Rept no. NRL-7777

Descriptors: *Digital computers, *Microprogramming, *Computer program documentation, *Signal processing, Computer applications, Arithmetic units, Radar, Sonar, Communication equipment, Prototypes, Input output devices.
Identifiers: *Computer software, All applications digital computer, Computer hardware, AADC(All Applications Digital Computer), AN/UYK-17(XB-1)(V), AN/UYK-17.

The AN/UYK-17 Signal Processing Element (SPE) is being developed at the Naval Research Laboratory to provide a high performance processing facility for radar, sonar, and communications systems. The design of the microprogrammable SPE nables realization of efficient, flexible solutions to problems that arise in digital signal processing tasks. The SPE is intended to be compatible with the Navy All Applications Digital Computer (AADC) now under development, and it is intended to be implemented as part of the AADC system. The SPE can also be used as a stand-alone processor.

AD-A016 807/0GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
The Macro Processing System STAGE2: Transfer of Comments to the Generated Text.
Technical rept.,
Odd Pettersen. Jul 75, 23p Rept nos. STAN-CS-75-503, AIM-263
Contract DAHC15-73-C-0435, ARPA Order-2494
Report on Stanford Artificial Intelligence Project.

Descriptors: *Artificial intelligence, *Macroprogramming, Data processing, Assemblers, Computer programs, Subroutines, Modification, Digital computers, Input output processing.
Identifiers: *Macro processing, PDP 10 computers.

This paper is a short description of a small extension of STAGE2, providing possibilities to copy comments etc. from the source text to the generated text. The description presupposes familiarity with the STAGE2 system: its purpose, use and descriptions, like (1) to (9). Only section 3 of this paper requires knowledge of the internal structures and working of the system, and that section is unnecessary for the plain use of the described feature. The extension, if not used, is completely invisible to the user: No rules, as described in the original literature, are changed. A user, unaware of the extension, will see no difference from the original version. (Author)

AD-A016 808/8GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
Synchronization of Concurrent Processes.
Technical rept.,
Odd Pettersen. Jul 75, 16p Rept nos. STAN-CS-75-502, AIM-262
Contract DAHC15-73-C-0435, ARPA Order-2494

Descriptors: *Artificial intelligence, *Computer programming, Data processing, Programming languages, Scheduling, High level languages, Algorithms, Buffer storage, Message processing, Variables.
Identifiers: Concurrent processes, Semaphores.

The paper gives an overview of commonly used synchronization primitives and literature, and presents a new form of primitive expressing conditional critical regions. A new solution is presented to the problem of readers and writers, utilizing the proposed synchronization primitive. The solution is simpler and shorter than other known algorithms. The first sections of the paper give a tutorial introduction into established methods, in order to provide a suitable background for the remaining parts. (Author)

AD-A016 810/4GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
Procedural Events as Software Interrupts.
Technical rept.,
Odd Pettersen. Jun 75, 9p Rept nos. STAN-CS-75-501, AIM-261
Contract DAHC15-73-C-0435, ARPA Order-2494

Descriptors: *Computer program documentation, *Artificial intelligence, *Minicomputers, *Computer programs, Interrupters, High level languages, Real time, Synchronization(Electronics), Scheduling, Variables.
Identifiers: *Software interrupts, *Computer software, Multiprogramming, PL/1 programming language, Design, Procedure oriented languages, Concurrent processes.

The paper deals with procedural events, providing a basis for synchronization and scheduling, particularly applied on real-time program systems of multiple parallel activities (multitask). There is a great need for convenient scheduling mechanisms for minicomputer systems as used in process control, but so far mechanisms somewhat similar to those proposed here found only in PL/1 among the generally known high-level languages. PL/1, however, is not very common on computers of this size. Also, the mechanisms in PL/1 seem more restricted, as compared to those proposed here. A new type of boolean program variable, the EVENTMARK, is proposed. Eventmarks represent events of any kind that may occur within a computational process and are believed to give very efficient and convenient activation and scheduling of program modules in a real-time system. An eventmark is declared similar to a procedure, and the proposed feature could easily be amended as an extension to existing languages, as well as incorporated in future language designs. (Author)

AD-A016 811/2GA PC$7.00/MF$2.25
Stanford Univ Calif Dept of Computer Science

PYGMALION: A Creative Programming Environment.
Technical rept.,
David Canfield Smith. Jun 75, 196p Rept nos. STAN-CS-75-499, AIM-260
Contract DAHC15-73-C-0435, ARPA Order-2494

Descriptors: *Interactive graphics, *Computer programming, *Dynamic programming, Compilers, Programming languages, Two dimensional, Visual perception, Algorithms, Pictures, Creativity, Computer programs, Variables, Memory(Psychology), Shape, Vocabulary.
Identifiers: Pygmalion computer program, Artists, Visual images, Icons.

PYGMALION is a two-dimensional, visual programming system implemented on an interactive computer with graphics display. Communication between human being and computer is by means of visual entities called icons, subsuming the notions of variable, reference, data stucture, function and picture. The heart of the system is an interactive remembering editor for icons, which executes and (Optionally) saves operations for later reexecution. The display screen is viewed as a document to be edited. Programming consists of recreating a sequence of display frames, the last of which contains the desired information. Display frames are modified by editing operations.

AD-A016 823/7GA PC$8.75/MF$2.25
California Univ Los Angeles Dept of Computer Science
Computer Network Research.
Semiannual technical rept. 1 Jul-31 Dec 74,
Leonard Kleinrock. 31 Dec 74, 291p
Contract DAHC15-73-C-0368
See also report dated 30 Jun 74, AD-A008 422.

Descriptors: *Communications networks, *Data processing terminals, Data transmission systems, Radio transmission, Signal processing, Data processing security, Time sharing, Message processing, Mathematical models.
Identifiers: *Computer networks, ARPA computer network, ALOHA system, Switching theory, Computer performance evaluation, Computer privacy, Packet communications.

A major area of research during this period has been that of packet switching in radio channels. The problem here is to make a contribution to the design of terminal access networks, namely those which lie between the terminal itself and perhaps a high level network such as the ARPANET. The communication medium studied is that of radio transmission in a digital mode and takes advantage of the resource sharing and packet switching principles which were developed for the study of the ARPANET and for the study of satellite communications in a packet switched mode. The central issues here involve the analysis of the behavior of a collection of terminals communicating with a radio repeater in a highly uncontrolled fashion. The key idea here as opposed to satellite packet switching is that terminals may listen to other terminals' transmissions by sensing the radio frequency carrier and if the channel is sensed busy than other terminals will inhibit their own transmissions thereby preventing a collision. The hidden terminal problem is studied as well as a busy tone solution to that problem.

AD-A016 827/8GA PC$5.25/MF$2.25
David W Taylor Naval Ship Research and Development Center Bethesda Md
Computer Graphics Bibliography,
Jackie Potts. Jan 75, 119p Rept no. DTNSRDC-4602

Descriptors: *Computer graphics, *Interactive graphics, *Bibliographies, Computer programming, Computer aided design, Computer applications, Architecture, Education, Medicine, Management, Editing, Manufacturing, Transportation.

This graphics bibliography covers the two major divisions of passive and interactive computer graphics. It includes graphics applications in such fields as analysis, architecture, computer-aided design, management, medicine, education, editing, manufacturing transportation, science, and others. It covers the years 1950 to the present. It contains approximately 1,000 references indexed by author, under the headings of applications, interactive, passive, potpourri, and software.

AD-A016 858/3GA PC$3.25/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
A Comparative Study of Single-Versus Double-Sequence Data-Entry Methods for Use with the SB-3614/TT Switchboard.
Final rept.,
R. Bruce McCommons, Thomas C. Cook, and Monica M. Glumm. Sep 75, 24p Rept no. HEL-TM-22-75

Descriptors: *Information systems, *Input output devices, *Keyboards, *Switchboards, Data processing terminals, Memory devices, Man computer interface, Human factors engineering, Tactical communications.
Identifiers: *Data entry systems.

Three methods of programming trunk-terminal assignments into the electrically alterable nonvolatile memory (EVANVM) of the SB-3614/TT switchboard were compared. One was the double-sequence method recently proposed by the SB-3614/TT contractor (GTE Sylvania, Needham Heights, MA). The other two were single-sequence methods developed by the authors. The two single-sequence methods used identical data entry procedures; but with one, visual feedback was supplied to the test subjects (Ss) as an alphanumeric display. Results of this study showed that both single-sequence method were superior to the double-sequence method, in the Ss could program faster and made fewer errors. Of the two single-sequence methods, the one employing visual feedback enhanced Ss performance, but, overall, this enhancement was not statistically significant.

AD-A016 898/9GA PC$3.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
Function Generation for Analog Simulation Studies,
Ralph E. Shear. Sep 75, 17p Rept no. BRL-1828

Descriptors: *Analog simulation, *Dynamic programming, Inequalities, Functions(Mathematics), Approximation, Curve fitting.
Identifiers: *Function generators.

Dynamic programming algorithms and computer programs have been developed for automatic generation of functions for analog simulation studies. The algorithms provides a fit consisting of continuous piecewise linear functions which minimizes a given functional subject to non-negativity and integral constraints. The algorithms developed are efficient in terms of cost and time and provide an accurate, effective and useful means of function generation.

AD-A016 901/1GA PC$3.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
A Computer Solution of the Buckingham Pi Theorem Using SYMBOLANG, A Symbolic Manipulation Language.
Final rept.,
Morton A. Hirschberg. Aug 75, 20p Rept no. BRL-1824

Descriptors: *Computer programming, *Computations, Computer programs, FORTRAN.
Identifiers: *Buckingham pi theorem, SYMBOLANG programming language, *Dimensional analysis, Symbolic programming, BUCKY computer program.

Among the theories of similitude, application of the Buckingham Pi Theorem allows one to find meaningful relationships among variables, check the formulation of a system of equations, and allow prediction from scaled parameters. Simply stated, the Pi Theorem asserts that if there are n variables involving N fundamental units, these may be combined to form n-N dimensionless parameters each containing N+1 variables. SYMBOLANG is a FORTRAN-based symbol manipulator using a list structure. Symbol manipulators operate on strings of symbols rather than numbers. As an example, a symbol manipulator allows multiplication of N+1 by N-1 to obtain (N sup 2)-1. A list structure allows data to be stored and manipulated by relationships rather than sequentially or by some other scheme.

AD-A016 938/3GA PC$9.25/MF$2.25
RCA Missile and Surface Radar Div Moorestown N J
Real-Time Tactical Operating System Study. Volume 1.
Final rept. Jul 74-Sep 75,
S. Steele, J. Kulp, A. Decegama, C. Yeisley, and T. Hoke. Oct 75, 311p ECOM-74-0597-F-Vol-1
Contract DAAB07-74-C-0597
See also Volume 2 dated Oct 75, AD-A016 941.

Descriptors: *Data processing security, *Computer programming, Real time, Data bases, Compilers, Scheduling, Multiprocessors, Interfaces, Input output devices, Tactical data systems.
Identifiers: *Operating systems(Computers), Computer performance evaluation, Data structures, Computer privacy, Paging, Logic design.

A detailed analysis and characterization of tactical real-time operating systems (RTOS) that can be used to develop: (1) a guideline for specifying and designing tactical RTOS and (2) a generalized, parameterized RTOS module for a broad class of tactical systems is presented. The approach taken in this study was to integrate existing technology and past design experiences into a framework for RTOS design and performance evaluation. The final report presents: (a) An RTOS Canonical Form - this is a complete description of a set of real-time operating systems in terms of tactical environments, OS architecture, functional components, OS interfaces, data structures, and critical design parameters. (b) Methodology for RTOS Specification and Design - a logical step by step sequence that would allow for efficient specification and/or design of a tactical RTOS. (c) Recommendations for a Performance Evaluation Tool - a tool that would enable the evaluation of a unique RTOS design given a particular set of environmental parameters.

AD-A016 940/9GA PC$3.75/MF$2.25
General Electric Corporate Research and Development Schenectady N Y
Design, Fabrication, and Evaluation of an Electron Beam Addressable High Information Density Memory Tube.
Quarterly rept. no. 1, 1 Mar-30 May 75,
C. Q. Lemmond, W. C. Hughes, C. G. Kirkpatrick, G. E. Possin, and J. K. Fisher. Oct 75, 35p Rept no. SRD-75-099 ECOM-1312-1-75
Contract DAAB07-75-C-1312

Descriptors: *Memory devices, *Storage tubes, Electron optics, Random access computer storage.
Identifiers: Computer storage devices.

The tube is to be a sealed-off, self-contained unit consisting of an electron source, the necessary electron optics for performing the required write and read functions, and a storage structure containing approximately 1.8 x 10 to the 7th power elements. A reliable and well-engineered memory tube demonstrating life and environmental characteristics are objectives of this program. Two memory tubes are the goal of the program. Vibration tests were conducted on an electron beam memory tube furnished General Electric by the U.S. Army Electronics Command. These tests will dictate design changes necessary so that an improved tube will meet vibrational requirements. General Electric has modified its Memory Test System for tube performance tests, RFI tests and temperature tests. Several improvements to the BEAMOS tube have been made and are described.

AD-A016 941/7GA PC$8.75/MF$2.25
RCA Missile and Surface Radar Div Moorestown N J
Real-Time-Tactical Operating System Study. Volume 2.
Final rept. Jul 74-Sep 75,
S. Steele, J. Kulp, A. Decegama, C. Yeisley, and T. Hoke. Oct 75, 288p ECOM-74-0597-F-Vol-2
Contract DAAB07-74-C-0597
See also Volume 1 dated Oct 75, AD-A016 938.

Descriptors: *Data processing security, *Computer programming, Real time, Data bases, Compilers, Scheduling, Multiprocessors, Interfaces, Input output devices, Tactical data systems.
Identifiers: *Operating systems(Computers), Computer performance evaluation, Data structures, Computer privacy, Paging, Logic design.

Contents: RTOS (Real Time Operating Systems) design philosophy; A generalized parameterized RTOS design model; Bibliography; RTOS glossary.

AD-A016 951/6GA PC$8.50/MF$2.25
Kansas State Univ Manhattan Dept of Computer Science
Research into the Development of a Low-Cost Hardware Monitor.
Final rept.,
V. Wallentine, G. Anderson, R. Keller, and P. Fisher. Jul 75, 271p USACSC-AT-75-07
Grant DAHC04-74-G-0103

Descriptors: *Central processing units, *Minicomputers, *Monitors, Data processing terminals, Computer graphics, Logic circuits, Compilers, Computer programming, Computer programs, FORTRAN.
Identifiers: *Computer systems hardware, *Computer performance evaluation, *Computer hardware monitors, FORTRAN 4 programming language.

The effort in pursuance of the stated objective was concentrated on the design of the hardware in the monitor, the design of the software to control the hardware, and the development of a basic reporting package useful in analyzing the data collected. The design objectives of the hardware monitor and the software interface between the monitor and the analyst were as follows: (1) To provide all the capabilities of those currently available on the commercial market; (2) To provide the measurement analyst a more flexible measurement tool with which to explore new measurements and their correlations before investing the time and effort to manually set the logic for desired measurements; (3) To develop a measurement front-end for a central processing system (minicomputer) which could be used to monitor a large range of subject systems (to provide a device capable of tracking at nanosecond speed as well as milisecond speed; (4) To provide an automated method of establishing (a level of) correctness of the measurement (data) collected; (5) To relieve the measurement analyst of detailed control of the hardware monitor and permit him to concentrate more intently on the measurement experiment.

COM-75-11372/0GA PC$3.50/MF$2.25
National Bureau of Standards, Washington, D.C.
Computer Security Guidelines for Implementing the Privacy Act of 1974.
Final rept.,
Thomas C. Lowe. 30 May 75, 23p FIPS-PUB-41
Federal Information Processing Standards Publication.

Descriptors: *Data processing security, *Computer networks, Standards, Risk, Management information systems, Public law.
Identifiers: *Federal information processing standards, *Computer privacy, *Computer information security, *Privacy Act(1974), Personal privacy.

This publication provides guidelines for use by Federal ADP organizations in implementing the computer security safeguards necessary for compliance with Public Law 93-579, the Privacy Act of 1974. A wide variety of technical and related procedural safeguards are described. These fall into three broad categories: physical security, information management practices, and computer system/network security controls. As each organization processing personal data has unique characteristics, specific organizations should draw upon the material provided in order to select a well-balanced combination of safeguards which meets their particular requirements.

COM-75-11432/2GA PC$4.25/MF$2.25
National Bureau of Standards, Washington, D.C. Optical Systems Section
Preparation of Reference Data Sets for Character Recognition Research.
Final rept.,
M. Leighton Greenough, and Robert M. McCabe. 30 Jun 75, 53p NBSIR-75-746
Sponsored in part by Postal Service, Rockville, Md. Pattern Recognition and Communications Branch.

Descriptors: *Character recognition, *Optical character recognition devices, Pattern recognition, Microfilm, Video signals, Optical scanners, Reading machines.
Identifiers: *Mail processing.

A reference data set contained on magnetic tape has been generated for research in optical character recognition and related fields. The data set contains video data in 16 levels for each point in a 24 x 24 scanning grid, applied to approximately 30,000 characters. The input material, on some 2200 simulated address mailpieces, includes a range of character quality from excellent to poor. The data set was prepared by first microfilming the address fields and printing positive transparencies. Then preselected characters were scanned in the NBS FOSDIC. Through the use of calibrated gray scales which were filmed and scanned along with the addresses, corrections were applied to assure linearity of overall response. A second reference data set was also prepared from the same input material of simulated mailpieces.

COM-75-11435/5GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Computer Systems Engineering Div.
Calibration of Unrecorded Low and Medium Density Type Magnetic Disk Pack Surfaces,
Nicholas P. Goumas. Oct 75, 26p NBS-TN-884

Descriptors: *Magnetic disks, Calibrating, Standards, Surfaces.

The publication describes the design requirements and the operation of the NBS test bed that is used for calibrating unrecorded magnetic disk pack surfaces for low and medium density use. The signal level calibration is made with respect to a reference level that is derived from the NBS Standard Amplitude and Data Reference Surfaces that are held in repository at NBS. The techniques for calibrating the measurement system with the NBS repository Reference Surfaces and the calibration of candidate reference disks are described in detail.

COM-75-11438/9GA PC$6.25/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
Computer Performance Evaluation: Report of the 1973 NBS/ACM Workshop Held in San Diego, California in March 1973.
Special pub. (Final),
S. Jeffery, Barry W. Boehm, and Thomas E. Bell. Sep 75, 167p* NBS-SP-406
Library of Congress Catalog Card no. 75-619080. See also report dated Sep 74, COM-74-50931.

Descriptors: *Meetings, *Computers, Performance evaluation, Computer programming, Operating systems(Computers), Monitors, Logic design, Mathematical models, Queueing theory.
Identifiers: *Computer performance evaluation, Compumetrics.

An ACM/NBS Workshop on Computer Performance Evaluation (CPE) was held in San Diego, California in March, 1973. The papers, workshop discussions, conclusions and recommendations presented in this volume address specific problems in making computer performance evaluation a commonplace and productive practice. While several of the conclusions indicate that improvements are needed in performance analysis tools, another suggests that improved application of CPE could be achieved by better documentation of analysis approaches. More integration of data collection and modeling are considered necessary for the performance analysis field to develop its full potential. Participants noted that the common emphasis on data collection or modeling, to the exclusion of considering objectives, often seriously degrades the value of performance analysis.

COM-75-50552/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Impermanent Balance Between Man and Computer.
Final rept.,
Ruth Davis. 11 Oct 74, 1p
Pub. in Science, v186 p99, 11 Oct 74.

Descriptors: *Computers, *Man machine systems.
Identifiers: Reprints.

This requested editorial discussed the relative but changing balance between man and computer in the accomplishment of so-called intellectual tasks. It highlights the impermanence of the balance and emphasizes the need for people to better understand their need to define the man-computer interrelationship.

COM-75-50588/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Archival Data Storage.
Interim rept.,
Sidney B. Geller. Oct 74, 4p
Pub. in Datamation, v20 n10 p72, 75-76, 80 Oct 74.

Descriptors: *Data storage devices, Archives, Costs.

Identifiers: Computer information security, Reprints.

This paper developes some archival language and discusses factors which must be considered when an archival data storage system is designed. These include types of contents, content decay rates, content and medium lifetimes, content density and system costs. Other archival storage quality factors such as information security and recovery are considered.

COM-75-50610/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Data Storage in the Cerebellar Model Articulation Controller (CMAC).
Final rept.,
J. S. Albus. Sep 75, 6p
Pub. in Trans. ASME Series G, Jnl. Dyn. Syst. Meas. Control, v97 n3 p228-233 Sep 75.

Descriptors: *Data storage, *Computer storage devices, Mathematical models.
Identifiers: Reprints.

The storage of manipulator control functions in the CMAC memory is accomplished by an iterative process which, if the control function is sufficiently smooth, will converge. There are several different techniques for loading the CMAC memory depending on the amount of data which has already been stored and the degree of accuracy which is desired. The CMAC system lends itself to a 'natural' partitioning of the control problem into manageable subproblems. At each level the CMAC controller translates commands from the next higher level into sequences of instructions to the next lower level. Data storage, or training, is accomplished first at the lowest level and must be completed, or nearly so, at each level before it can be initiated at the next higher level.

COM-75-50627/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Utility and Economics of an On-Line Reference Data Network.
Final rept.,
Joseph Hilsenrath. 1973, 21p
Pub. in Proceedings of Conference on Mechanism of Explosions and Blast Waves, Naval Weapons Station, Yorktown, Va. 13-15 Nov 73, sec17 p1-21 1973.

Descriptors: *Computer networks, *Information systems, Time sharing, Costs, Economic analysis.
Identifiers: On line systems, Reprints.

This paper describes a prototype on-line data retrieval and data computation system and discusses the scientific, technical and organizational characteristics required to make such a system an economically viable reality. The general characteristics of the envisioned system are: (1) Authoritative data collections and well documented sources stored on a reliable time-shared computer system; (2) Extended precision representation and computing where required; (3) Efficient programs to generate data not explicitly stored; (4) Easy to use conversational on-line access from inexpensive terminals; (5) A reliable and extensive communication network to eliminate or reduce toll charges; (6) Low user charges.

NTIS/PS-75/789/8GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Read Only Memories (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
David W. Grooms. Oct 75, 42p*

Descriptors: *Bibliographies, *Read only storage, Arithmetic and logic units, Computer networks, Central processing units, Optical equipment, Semiconductor computer storage, Computer programming.
Identifiers: *Read only memories, Optical storage, Large scale integrated circuits.

The bibliography includes research on the design, development, and application of read-only memories. Optical read-only storage as well as software for ROM is included. (Contains 37 abstracts)

NTIS/PS-75/811/0GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Random Access Memories (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
David W. Grooms. Nov 75, 73p*

Descriptors: *Bibliographies, *Random access computer storage, Logic circuits, Computer programming, Thin film storage, Parallel processors, Design criteria.
Identifiers: Large scale integrated circuits.

Research on the design, development and application of random access storage is cited. Included are studies on wall placement techniques, domain wall observations, microcircuitry, and software development. (Contains 68 abstracts)

N75-31119/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
The Revolution in Data Gathering Systems.
J. M. Cambra, and W. F. Trover. Aug 75, 26p
NASA-TM-X-62452, A-6144

Descriptors: *Computer techniques, *Data acquisition, *Technology assessment, Data processing, Large scale integration, Medium scale integration, Minicomputers.

For abstract, see STAR 1322

N75-31482/3GA PC$3.75/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Acquisition and Digital Processing of Environmental Data.
J. M. Bouquin. Sep 75, 43p NASA-TT-F-16544, ESRO-SP-99
Contract NASW-2790
Tran-Transl. Into English of Conf. Paper Esro-SP-99, Paris. Conf-Presented at 3D Testing Symp. Frascati, Italy, Oct. 1973 p 581-602.

Descriptors: *Data acquisition, *Digital systems, *Digital techniques, *Environments, *Vibration, Calibrating, Digital filters, Fourier transformation, Signal processing.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31530/9GA PC$3.75/MF$2.25
Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik der Luft- und Raumfahrtkonstruktionen.
Construction and Calculation Using Finite Elements Konstruktion und Berechnung MIT Finiten Elementen.
J. H. Argyris, and I. Grieger. 1973, 49p ISD-148
Subm-Sponsored by Bundesmin. Fuer Forsch. Und Technol.
Language in German.

Descriptors: *Computer graphics, *Computerized design, *Finite element method, Computer programming, Disks (Shapes), Display devices, Perforated plates, Rail transportation, Vehicle wheels.

For abstract, see STAR 1322

N75-31760/2GA PC$4.25/MF$2.25
Aeronautical Research Labs., Melbourne (Australia).
Simulating a Time-Sharing Computer System.
R. C. Adams. Mar 75, 63p ARL/STRUC-REPT-357

Descriptors: *Computerized simulation, *Time sharing, Computer systems programs, Hardware, Systems analysis.

For abstract, see STAR 1322

N75-31769/3GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Gray-Shading for the SD-4060 Graphics Device.
C. Gloeckler. Aug 75, 29p NASA-TM-X-70958, X-626-75-212

Descriptors: *Computer graphics, *Fortran, *User manuals (Computer programs), Computer programming, Plotting, User requirements.

For abstract, see STAR 1322

N75-31770/1GA PC$6.25/MF$2.25
Centre National de la Recherche Scientifique, Toulouse (France). Lab. d'Automatique et d'Analyse des Systemes.
Asynchronus Logical Command and Control Systems with Concurrent Evolutions Etude des Systemes Logiques de Commande Asynchrones a Evolutions Simultanees.
Ph.D. Thesis - Toulouse Univ.
M. Courvoisier. 1974, 164p LAAS-PUBL-1102
Language in French.

Descriptors: *Algorithms, *Command and control, *Machine oriented languages, Logic circuits, Logic design, Logical elements, Man machine systems, Synchronism, Systems analysis, Systems engineering, Time dependence.

For abstract, see STAR 1322

N75-31771/9GA PC$4.25/MF$2.25
Stuttgart Univ. (West Germany). Inst. fuer Informatik.
Facilitation of Hybrid Computer Use by Problem-Oriented Level Programming Erleichterung des Einsatzes Hybrider Rechensysteme durch Programmierung Auf Problemorientierter Ebene.
H. Bannas, V. Hecht, B. Portugall, W. Reuss, and H. Rzehak. 1973, 66p IFI-03/73
In German; English Summary.

Descriptors: *Hybrid computers, *Language programming, *Logic circuits, *Problem solving, Analog simulation, Digital techniques, Gates (Circuits), Switching circuits.

For abstract, see STAR 1322

N75-31772/7GA PC$3.25/MF$2.25
Stuttgart Univ. (West Germany). Inst. fuer Informatik.
The Formal Semantics of Operating Systems.
E. J. Neuhold. 1973, 9p IFI-04/73
Subm-Submitted for Publication. Conf-Presented at the Intern. Computing Symp., 1973.

Descriptors: *Multiple output programs, *Operating systems (Computers), *Semantics, *User manuals (Computer programs), Computer storage devices, Error analysis, Information systems, Language programming, Protection, Time sharing.

For abstract, see STAR 1322

N75-31773/5GA PC$3.75/MF$2.25
Stuttgart Univ. (West Germany). Inst. fuer Informatik.
Stochastic Optimization Methods and Their Value for Experimenting with Computing Systems.
B. Baumeister, and H. Beilner. 1974, 29p IFI-02/74

Descriptors: *Computer programming, *Experimentation, *Operating systems (Computers), *Simulation, *Stochastic processes, Independent variables, Operations research, Performance tests, System effectiveness, Systems analysis.

For abstract, see STAR 1322

N75-31774/3GA PC$3.75/MF$2.25
Stuttgart Univ. (West Germany). Inst. fuer Informatik.
Specification and Proving of Command Programs.
E. J. Neuhold, and T. Weller. 1975, 32p IFI-01/75

Descriptors: *Checkout, *Command and control, *Computer systems programs, *Language programming, *Specifications, Algorithms, Axioms, Correction, Data processing.

For abstract, see STAR 1322

N75-31775/0GA PC$3.25/MF$2.25
Stuttgart Univ. (West Germany). Inst. fuer Informatik.
A Problem-Oriented Input Processor Supporting Problem Solving.
W. Glatthaar. 1975, 8p IFI-02/75

Descriptors: *Computer programming, *Interfaces, *Problem solving, Computation, Conversation, Modules, Psychology, Subroutines, Switching, Time sharing, User manuals (Computer programs).

For abstract, see STAR 1322

N75-31821/2GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A Parallel Jacobson-Oksman Optimization Algorithm.
T. A. Straeter, and A. T. Markos. Sep 75, 19p NASA-TN-D-8020, L-10044

Descriptors: *Algorithms, *Optimization, *Parallel processing (Computers), Digital computers, Mathematical models, Numerical analysis, Problem solving.

For abstract, see STAR 1322

N75-31849/3GA PC$3.25/MF$2.25
Stuttgart Univ. (West Germany). Inst. fuer Informatik.
Sensitivity Model Generator as a Tool for Automatic Credibility Tests of Continuous System Simulation.
G. Stuebel. 1975, 11p IFI-03/75

Descriptors: *Computerized simulation, *Control simulation, *Control theory, *Sensitivity, Computer programming, Continuums, Mathematical models, Performance tests, Report generators.

For abstract, see STAR 1322

N75-31940/0GA PC$5.25/MF$2.25
D P Associates, Inc., Huntsville, Ala.
General Purpose Simulation System of the Data Management System for Space Shuttle Mission 18.
Final Report.
N. M. Bengtson, J. M. Mellichamp, and J. Crenshaw. 15 Jul 75, 103p NASA-CR-143942
Contract NAS8-31458

Descriptors: *Computerized simulation, *Data management, *Space shuttles, Computer programs, Input/output routines, Programming languages.

For abstract, see STAR 1322

PAT-APPL-588 104/GA PC$3.75/MF$2.25
Department of the Navy Washington D C
High-Speed Adder.
Patent Application,
William F. Gehweiler, and Junius I. Pridgen.
Filed 18 Jun 75, 34p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Arithmetic units, Patents, Logic circuits, Digital computers.
Identifiers: PAT-CL-235-175, *Patent applications.

The patent application describes a high-speed adder circuit capable of performing addition with binary numbers in 1's complement, 2's complement or sign-magnitude formats. The adder can be made in the form of a single chip that can be assembled in multiple units to expand its capacity. There is a provision for converting minus zero to plus zero so as to prevent oscillations from occurring in the loop circuit. Also, the sum output is automatically shifted to the correct format when an overflow condition occurs.

9C. Electrical and Electronic Engineering

AD-A016 470/7GA PC$7.00/MF$2.25
Hughes Aircraft Co Culver City Calif Display Systems and Human Factors Dept
Dot Matrix Display Symbology Study.
Final rept. 29 Jan-21 Nov 74,
R. J. Vanderkolk, J. A. Herman, and M. L. Hershberger. Jul 75, 198p Rept nos. HAC-P75-114K, HAC-Ref-D1165 AFFDL-TR-75-72
Contract F33615-74-C-3065

Descriptors: *Matrix displays, *Cathode ray tube screens, Alphanumeric data, Symbols, Literature surveys, Trade off analyses, Human factors engineering, Recognition, Panels, Technology, Scientific research.
Identifiers: *Dot displays, Legibility, Flat panel displays.

This report describes a concentrated effort to identify and quantify the parameters involved in the design of matrix displays for legibility and to assess the design trade-offs against the criterion of symbol legibility. A literature survey was conducted to determine what information previously existed and its applicability to matrix displays. The literature survey is included as an appendix to this report.

N75-31869/1GA PC$3.75/MF$2.25
Institut fuer Naturwissenschaftlich- Technische Trendanalysen, Stohl/Kiel (West Germany).
Calorimetric Measurement of Absorbed Dose in a Pulsed gamma Radiation Field Kalorimetrische Messung der Absorbierten Dosis in Einem Gepulsten Gammastrahlungsfeld.
D. Kallmeyer, O. Koehn, and U. J. Roose. 1974, 34p BWVG-FBWT-74-14
Subm-Spor sored by Bundesmin. Fuer Verteidigung.
In German; English Summary.

Descriptors: *Electronic equipment, *Gamma rays, *Radiation damage, *Radiation dosage, *Weapon systems, Aluminum, Calorimeters, Lead (Metal), Liquid nitrogen, Silicon.

For abstract, see STAR 1322

9D. Information Theory

AD-A016 590/2GA PC$7.50/MF$2.25
Duke Univ Durham N C Dept of Electrical Engineering
Adaptive Optimum Array Tracking Detectors.
Technical summary rept. 1974-75,
Charles S. Liu. Aug 75, 240p Rept no. TR-11
Contract N00014-75-C-0191

Descriptors: *Signal processing, Bayes theorem, Antenna arrays, Waveforms, Markov processes, Signal to noise ratio, White noise, Coding, Fourier transformation, Computer programs, Beam forming, Computerized simulation.
Identifiers: *Signal detection, Parameter estimation.

The purpose of this study is to measure the performance degradation of array processors due to incorrect spatial a priori knowledge, and to further the theory of signal detectability for dynamic signals received by an array of sensors. Two classes of signal waveforms are considered in the first part of this report; one is the known waveform signal, the other is the Gaussian signal. For the known waveform case, an explicit functional form can be derived for the detectability index to characterize the performance loss. Performance results are shown for both the incorrect assumption about the signal location as well as the incorrect assumption about the directional noise location.

AD-A016 617/3GA PC$4.25/MF$2.25
Technology Service Corp Santa Monica Calif
Detection of Wandering Signals with an ALI Processor. Part I. Over-Resolution Case.
Interim rept. 1 Nov 74-1 Jul 75,
Gene B. Goldstein. 10 Jul 75, 64p Rept no. TSC-PD-A142-4-Pt-1
Contract N00014-75-C-0728
See also Part 2, AD-A016 618.

Descriptors: *Signal processing, Information theory, Radiofrequency filters, Integrators, Automatic, Spectrum analysis, Narrowband, Sine waves, Detection, Bandwidth, Estimates, Time, Stability, Resolution, Search theory.

The detection performance of a specific suboptimum processor, termed the Automatic Line Integrator (ALI), is examined when the signal consists of a sine wave of unknown phase whose frequency wanders within some a-priori band which is searched by the ALI processor. The signal's phase and frequency are considered to be nearly constant for a duration T sub C (termed the 'coherence length') which is unknown to the processor. In this, Part I, study the detection performance is examined when the ALI processor employs filters which integrate for a time period which is longer than T sub C. General formulas are derived which permit performance calculations to be made as a function of signal and processor parameters. A specific example is presented illustrating the use of the formulas. For the example displayed the ALI processor incurs approximately 4 dB loss relative to the ideal detector which is presumed to have knowledge of the signal's frequency and coherence length. A sequel, Part II, considers the under-resolution regime in which the ALI filter-bank integrates for a time less than T sub C. (Author)

AD-A016 618/1GA PC$4.25/MF$2.25
Technology Service Corp Santa Monica Calif

Detection of Wandering Signals with an ALI Processor. Part II. Under-Resolution Case.
Interim rept. 1 Nov 74-1 Jul 75,
Gene B. Goldstein. 18 Jul 75, 26p Rept no. TSC-PD-A142-4-Pt-2
Contract N00014-75-C-0728
See also Part 1, AD-A016 617.

Descriptors: *Signal processing, Information theory, Bandwidth, Estimates, Resolution, Search theory, Detection, Detectors, Frequency, Integrators, Chi square test, Spectrum analyzers.

The detection performance analysis for the ALI processor described in Part I is extended to the under-resolution regime in which the filters integrate for a time shorter than (or equal to) the signal coherence length. Formulas are presented which permit quantitative evaluation of the ALI's under-resolution performance. It is shown that for a fixed processor search band, B (the frequency region where one expects to find the signal if it is present at all), and for a specified signal coherence length and total processing time, the ALI's detection performance is insensitive to the degree of under-resolution committed by the processor. For the specific signal and processor parameters chosen for the Part I example, the ALI's under-resolution loss is smaller than its over-resolution loss over the useful range of detection probability. The under-resolution loss is approximately 2 dB relative to the ideal detector which is presumed to have knowledge of the signal's frequency and coherence length. The analysis and performance equations permit a comparison to be made between the overall performance of the suboptimum ALI processor and that which is attainable by the optimum processor. This performance comparison is the subject of a subsequent report. (Author)

AD-A016 632/2GA PC$3.25/MF$2.25
Illinois Univ At Urbana-Champaign Dept of Computer Science
Performance Evaluation of the Digital AM Receiver,
P. L. Mohan, E. Bracha, and J. W. S. Liu. Apr 75, 15p Rept no. UIUCDCS-R-75-757
Contract N00014-67-A-0305-0024

Descriptors: *Receivers, *Coders, Low pass filters, Digital systems, Amplitude modulation, Detectors, Clocks, Sampling, Parameters, Radiofrequency, Frequency response, Peak values.
Identifiers: *Burst encoders, Jitter.

The performance of the first digital AM receiver to employ Burst techniques is discussed. Some relevant parameters are evaluated. (Author)

AD-A016 928/4GA PC$3.75/MF$2.25
Rock Island Arsenal Ill General Thomas J Rodman Lab
Investigation of Digital Filtering Techniques for the Analysis of Experimental Data.
Final rept. Nov 74-Jun 75,
Lanny D. Wells. Jun 75, 45p Rept no. RIA-R-TR-75-024

Descriptors: *Digital filters, *Signal processing, Digital simulation, Band pass filters, Fourier transformation, Transfer functions, Computer programs, Power spectra, FORTRAN.
Identifiers: *Fast Fourier transform.

This paper presents techniques of processing digital data to remove unwanted frequencies and to simulate the effect of simple RC networks on the corresponding analog data. The development of these techniques provides: a means of isolating a signal from background noise, a means of removing low frequency drift from a signal, and a means of selectively reversing previous filtering. These techniques are valuable in the refinement and validation of digital simulations. The method presented in this paper used the Fast Fourier Transform. The methodology has been applied to remove noise and drift from experimental and mathematical model date relative to determining an RMS value of a tank gun pointing error.

AD-A016 955/7GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
The Use of Finite Fields and Rings to Compute Convolutions.
Technical note,
Irving S. Reed. 6 Jun 75, 26p Rept no. TN-1975-50 ESD-TR-75-241
Contract F19628-73-C-0002, ARPA Order-2006

Descriptors: *Signal processing, *Digital filters, *Transformations(Mathematics), Number theory, Fourier transformation, Rings(Mathematics), Theorems.
Identifiers: Galois theory, Discrete Fourier transform, Number theoretic transforms.

This note extends briefly the integer transforms of C.M. Radar (1972) to transforms over finite fields and rings. These transforms have direct application to digital filters and make possible digital filtering without round-off error. In some cases, the parameters of such number-theoretic transforms can be chosen so that substantial reductions in hardware are possible over what would be needed using classical digital filtering techniques.

N75-31846/9GA PC$3.75/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Sequential Least-Squares Using Orthogonal Transformations.
G. J. Bierman. 1 Aug 75, 47p NASA-CR-143485, JPL-TM-33-735
Contract NAS7-100

Descriptors: *Data smoothing, *Least squares method, *Orthogonality, *Spacecraft communication, *Spacecraft tracking, *Transformations (Mathematics), Algorithms, Computer programs, Matrices (Mathematics), Orbits, Stochastic processes.

For abstract, see STAR 1322

TT-72-58027 PC$6.25/MF$2.25
National Science Foundation, Washington, D.C. Div. of Computer Research.
Computer Elements and Systems,
N. G. Zagoruiko. 1975, 165p
Trans. from Vychislitelnye Sistemy (USSR) v45 1971.

Descriptors: *Signal processing, *Information theory, *Computer programming, Coding, Spectrum analysis, Algorithms, Translations, USSR.

The report discusses computer programming for signal processing. The report is in three parts: The taxonomy programs; Random search with adaptation programs; Spectral analysis programs.

9E. Subsystems

AD-A016 292/5GA PC$3.75/MF$2.25
American Electronic Labs Inc Lansdale Pa
Low Level Modulator and Isolator-Limiter-Detector Development.
Final rept. 28 Jan-30 Sep 75,
Donald L. Talhelm. 1 Oct 75, 30p
Contract N00014-74-C-0393
See also report dated 16 Dec 74, AD-A006 296.

Descriptors: *Modulators, *Demodulators, Attenuators, Limiters, Detectors, Semiconductor diodes, Electronic switches, Microwave equipment, Ultrahigh frequency, Insertion loss, Standing wave ratios, Sensitivity.

The report summarizes the development of an L-J Band low-level modulator and isolator-limiter-detector for use in the UHF range. Test data on insertion loss, attenuation, isolation, VSWR and response times are included for the modulator. For the isolator-limiter-detector data on tangential signal sensitivity (TSS) and VSWR are presented.

AD-A016 405/3GA PC$3.75/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
A Limited-Scan Antenna Comprised of a Microwave Lens and Phased-Array Feed.
Physical sciences research papers,
Robert V. McGahan. 2 May 75, 34p Rept nos. AFCRL-TR-75-0242, AFCRL-PSRP-631

Descriptors: *Lens antennas, Scanning, Antennas, Phased arrays, Radiofrequency lenses, Antenna radiation patterns, Antenna feeds, Electronic scanners, Microwave antennas.

Limited-scan antennas are finding increasing use in satellite communications and airport approach radars. Earlier attempts to achieve limited scan involved the use of parabolic lenses, zoning, and movable or dual-focus feeds. In the method described here, the main beam is scanned electronically by using a circular-arc phased array. The microwave lens is designed so that its back face satisfies the scanning condition. The beam is focused by shaping the front face of the lens to meet the required focusing condition and by varying the phase propagation of the lens. Two of the lenses studied were dielectric-loaded. A waveguide lens designed to scan in one dimension yielded experimental results that were good agreement with the theoretical predictions. Representative plots, and computer-generated farfield patterns of two topographically unique cases, are given.

AD-A016 564/7GA PC$4.25/MF$2.25
Michigan Univ Ann Arbor Radiation Lab
A Study of Axial Slot Arrays on a Circular Cylinder for Use on Electrically Small Vehicles.
Final rept. 15 Sep 74-30 Jun 75,
Dipak L. Sengupta, and Joseph E. Ferris. Sep 75, 67p Rept no. 013367-1-F AFCRL-TR-75-0466
Contract F19628-75-C-0036

Descriptors: *Antenna arrays, Slot antennas, Cylindrical bodies, Antenna radiation patterns, Directional antennas, Aircraft antennas, Guided missile antennas.

Radiation patterns produced by arrays of axial slots on a conducting cylinder are studied theoretically and experimentally to develop directive antenna systems for use on electrically small aircraft or missiles. The design of the array is mainly governed by the considerations of required field discriminations between various directions. A method has been developed for the design of a reduced-height waveguide cavity-backed slot which can be used as an individual radiating element of the array. Impedance and radiating properties of the slot element are studied and discussed.

AD-A016 671/0GA PC$3.75/MF$2.25
Mission Research Corp Santa Barbara Calif
EMP Induced High-Frequency Currents in Aerial Wires.
Topical rept. 1 Nov-30 Nov 74,
Conrad L. Longmire. 5 Aug 75, 31p Rept no. MRC-R-164 DNA-3633T
Contract DNA001-75-C-0094

Descriptors: *Antennas, Electromagnetic pulses, Electric current, Coupling(Interaction), Nuclear explosions, Wire, Maxwells equations.

The report addresses, by approximate analytical means, the high-frequency part of the response to close-in surface-burst EMP of a radial wire in air, connected to a conduited down wire.

AD-A016 695/9GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
A Low Sidelobe Ka-Band Antenna-Radome Study.
Journal article,
Joseph T. Mayhan, and Alan J. Simmons. 17 Jul 74, 5p Rept no. JA-4413 ESD-TR-75-266
Contract F19628-73-C-0002
Availability: Pub. in IEEE Transactions on Antennas and Propagation, p569-572 Jul 75.

Descriptors: *Microwave antennas, *Radomes, *Lens antennas, Sidelobes, Ka band, Antenna apertures, Boresighting, Parabolic antennas, Antenna radiation patterns, Reprints.

An experimental KA-band (37 GHz) lens antenna designed to have -40 dB sidelobes or lower outside a cone of minimum practical size is described. The results are compared to that optimum Taylor pattern which, for fixed aperture size, maximizes the directivity on boresight subject to the above sidelobe constraint. The effect of a thick homogeneous spherical radome on the sidelobes, as well as a more conventional dish antenna, was also measured. (Author)

AD-A016 776/7GA PC$4.75/MF$2.25
Harry Diamond Labs Adelphi Md
Damage Analysis Modified TRAC Computer Program (DAMTRAC),
George H. Baker, Alan D. McNutt, David M. Rubenstein, and G. Bradford Shea. May 75, 96p Rept no. HDL-TM-75-6
See also report dated Jun 68, AD-836 683.

Descriptors: *Solid state electronics, *Transient radiation effects, Semiconductor devices, Computer programming, Computerized simulation, Circuits.
Identifiers: DAMTRAC computer program.

A computer program tailored for EMP damage analysis of solid-state circuitry has been developed by modifying the existing transient radiation analysis by computer (TRAC) network analysis program. Modification of the TRAC diode and transistor models to include breakdown prameters and the addition of a semiconductor device parameter library have greatly simplified the analyst's task. An added feature is a subroutine that automatically calculates the amplitude and duration of transient power dissipated in circuit components.

AD-A016 824/5GA PC$4.75/MF$2.25
Texas Instruments Inc Dallas
Production Engineering Measure for an Integrated Power Switch (IPS). Volume II.
Final engineering rept. 17 May 73-30 Sep 75. 30 Sep 75, 83p Rept no. TI-03-75-27-Vol-2
Contract DAAB05-73-C-2063
See also Volume 1, AD-A016 972 and Volume 3, AD-A016 857.

Descriptors: *Switching circuits, Production engineering, Specifications, Processing, Assembly, Test methods, Integrated systems.
Identifiers: *Integrated power switches, *Production engineering measures.

The complete assembly and test process specifications for both the high-voltage and high-current versions of the Integrated Power Switch and their respective subassemblies are presented in detail. Each of the flow diagram control steps has an associated process specification. Several specifications are used repeatedly throughout the assembly and testing procedure. All specifications are arranged in the order in which the fabrication process first requires their use.

AD-A016 826/0GA PC$9.50/MF$2.25
Joint Technical Coordinating Group on Electronics Equipment Reliability
Final Report of the Joint Logistics Commanders Electronic Systems Reliability Workshop.
1 Oct 75, 334p
See also Summary report dated 1 Aug 75, AD-A014 568.

Descriptors: *Reliability(Electronics), *Meetings, Microcircuits, Electronic equipment, Management planning and control, Systems analysis, Test methods, Procurement, Avionics.
Identifiers: Computer program reliability.

The Workshop represents a culmination of almost three years of effort by the Joint Technical Coordinating Group on Electronic Equipment Reliability (JTCG-EER), which was devoted to a series of investigations for improving reliability and procurement practices related to microcircuits. After making substantial progress on its device related projects, the JTCG-EER decided to organize the Electronic Systems Reliability Workshop in order to address the system reliability problem and to consider means of developing improved management procedures, documentation, standards, and analytic and testing techniques for producing more reliable systems. The Workshop was organized into seven work groups, namely: Acquisition Reliability Management, Operational Reliability Management, Reliability Testing, Reliability Documentation, Reliability Analysis, Reliability Design Techniques, and Software Reliability.

AD-A016 857/5GA PC$4.75/MF$2.25
Texas Instruments Inc Dallas
Production Engineering Measure for an Integrated Power Switch (IPS). Volume III.
Final engineering rept. 17 May 73-30 Sep 75. 30 Sep 75, 98p Rept no. TI-03-75-27-Vol-3
Contract DAAB05-73-C-2063
See also Volume 2, AD-A016 824.

Descriptors: *Switching circuits, Production engineering, Quality control, Manuals, Integrated systems.
Identifiers: *Integrated power switches, *Production engineering measures.

A complete description of pertinent quality control procedures and requirements and the expected assembly inspection yield for each of the Integrated Power Switch inspection points is given.

AD-A016 866/6GA PC$5.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Rotor Blade Effects on L-Band Signals Received by Helicopter Antennas Mounted Above the Rotor Blade: CW Experiments.
Final experimental rept. for 1974,
C. M. De Santis, and F. Schwering. Oct 75, 118p Rept no. ECOM-4357

Descriptors: *Aircraft antennas, Helicopter rotors, Navigation, L band, Modulation, Electromagnetic shielding, Helicopters, Rotor blades(Rotary wings), Radio signals, Amplitude, Receivers, Continuous Waves, Rotation.

Rotor effects on L-Band signals received by helicopter antennas have been examined experimentally. CW data for two receiving-antenna locations above the rotor blade, viz. at the turning axis of the blade and on the tail, is presented. This data shows the amplitude and phase variations to be expected as a function of the direction of the incident signal. The effects of counterpoise size and height above the main rotor are also studied. In general, it is shown that the signal variations were typically < + or - 3 dB for polar angles of arrival thata < or = to 70 deg; but that for greater angles, the signal amplitude changes by as much as + or - 7 dB. For thata >90 deg (an arrival angle obtained, for instance, during a turning and banking maneuver) signal levels can decrease by -15 dB and the phase variation can exceed 180 deg.. The tail location appears to be a better choice for the antenna than the center location. A worst-case analysis of CW rotor effects is presented in Appendix I. Appendices II and III contain some of the data measured at both antenna locations and should be referred to for a better understanding of the signal variations involved. (Author)

AD-A016 949/0GA PC$4.25/MF$2.25
TRW Inc Lawndale Calif Semiconductor Div
Production Engineering Measure for an Integrated Circuit Power Amplifier 600-1000 MHz for Tactical Radio Equipment.
Quarterly rept. no. 13, 1 Apr-30 Jun 75,
Roger C. DeBlooIs. Jun 75, 53p
Contract DAAB05-72-C-5844
See also report dated Mar 75, AD-A013 401.

Descriptors: *Power amplifiers, *Integrated circuits, Production engineering, Radio equipment, Tactical communications, Transistors, Ultrahigh frequency.
Identifiers: *Production engineering measures.

The objective of the production engineering measure is to establish a production capability to manufacture broadband, highly reliable, integrated circuit amplifiers for use in Army Communications equipment. The work involves transistor design optimization, fabrication of an impedance transformer, and fabrication of a suitable substrate interconnection pattern and package. The program includes actual fabrication of test samples, a production run, and performance of electrical, mechanical, and environmental tests as required. Twelve of the first article amplifiers were environmentally tested during this quarter. The amplifiers were divided into groups of two and three and subjected to the various tests. Results are presented.

AD-A016 950/8GA PC$7.00/MF$2.25
Ohio State Univ Columbus Electroscience Lab
Scattering Properties of Periodic Arrays Consisting of Resonant Multi-Mode Elements.
Technical rept.,
Edward L. Pelton. Sep 75, 182p Rept no. ESL-3622-3 AFAL-TR-75-98
Contract F33615-73-C-1173

Descriptors: *Antenna arrays, Scattering, Dipole antennas, Radio fields, Computations, Multimode, Theses.

The report presents the results of an investigation of the reflection properties of periodic arrays of dipoles. Through Babinet's principle the results obtained also apply to periodic slot arrays. The specific periodic array geometries treated are composed of Y elements and symmetrical crossed elements. In the theoretical investigation presented for the Y element arrays, both the element geometry and array grid structure are treated as adjustable design parameters. By applying the results presented an unlimited number of useful Y element array geometries having different grid structures can be obtained. Three specific array geometries are presented to demonstrate the design principles involved and the array performance attainable. Obtaining useful array configurations requires simultaneous analytical design of both the element and grid geometries. A method is described for obtaining specific optimum Y array designs.

AD-A016 962/3GA PC$5.25/MF$2.25
Martin Marietta Aerospace Orlando Fla
PWB Production Assembly Cost Guidelines (U).
Quarterly progress rept. no. 1, 26 Mar-31 Jul 75,
Sol C. Osborne, and Wendell R. Hutchinson. Jul 75, 122p Rept no. OR-13826
Contract DAAB07-75-C-0029

Descriptors: *Printed circuits, *Cost analysis, Costs, Assembly, Circuit boards, Manuals, Production, Automation, Production engineering.

A mini-printed wiring board (PWB) production cost manual was prepared identifying and describing representative sections of a manual for the program goal of providing guidelines enabling user to select and evaluate manual and automatic assembly methods. Assembly and cost data was obtained by surveys defining PWBs and assembly capabilities including cost analysis models.

AD-A016 972/2GA PC$7.25/MF$2.25
Texas Instruments Inc Dallas
Production Engineering Measure for an Integrated Power Switch (IPS). Volume I.
Final engineering rept. 17 May 73-30 Sep 75,
Bill H. Terrell. Sep 75, 212p Rept no. TI-03-75-27-Vol-1
Contract DAAB05-73-C-2063
See also Volume 2, AD-A016 824, Volume 3, AD-A016 857 and report dated Feb 75, AD-A008 442.

Descriptors: *Switching circuits, Production engineering, Logic circuits, Transistors, Power supplies, Electrooptics, Integrated systems, Power conditioning, Assembly.
Identifiers: *Integrated power switches, *Production engineering measures.

The object of study was to optimize the functional design and producibility of the Integrated Power Switch and to develop the processes, production techniques, and facilities to demonstrate a production rate capability of 250 Integrated Power Switches per month.

AD-A016 986/2GA PC$3.75/MF$2.25
Ohio State Univ Columbus Electroscience Lab
Investigation of the Gain Measured in Periodic Slotted Surfaces.
Interim technical rept.,
R. D. Fulton. Mar 75, 39p Rept no. ESL-3622-5
AFAL-TR-75-109
Contract F33615-73-C-1173

Descriptors: *Radomes, *Slots, Electromagnetic wave propagation, Planar structures, Arrays, Gain, Antenna apertures, Radio transmission, Radomes.

For some time now measurements of planar arrays of slots have shown gain (transmission coefficients greater than unity) at high angles of incidence. The report is a summary of an investigation to determine why gain has been measured since conservation of energy prohibits amplification by such an array. Two possible causes are considered: (1) Focusing by the array, and (2) diffraction from the aperture in the ground plane used for carrying out the measurements. Results of analytical investigations and measurements indicate that edge diffraction is the cause. This work is significant to the Air Force because it will allow greater accuracy in and understanding of measurements made on slotted surfaces such as used for metallic radomes.

COM-75-11439/7GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Engineering Mechanics Section.
Non-Metallic Antenna-Support Materials.
Annual interim rept. no. 2, 16 Oct 72-15 Oct 73,
Nixon Halsey, Donald E. Marlowe, and Leonard Mordfin. Jun 74, 46p NBSIR-74-557
Contract F33615-72-M-5000
See also report dated Apr 73, COM-74-11770.

Descriptors: *Supports, *Antennas, *Fiberglass reinforced plastics, Rods, Polyester resins, Guy wires, Manufacturing, Optimization, Weatherproofing, Tests.

Thirteen samples of a pultruded, glass fiber-reinforced-polyester rod material were manufactured using a different combination of the manufacturing process parameters for each. These samples were tested to evaluate the effects of nine different process parameters on the properties and characteristics of the rods. Elevated-temperature stress-rupture tests under saturated humidity were used as an accelerated measure of long-term weatherability. The test results were somewhat inconsistent, but it appears that certain process parameters, such as collimation and ultrasonic agitation of the rovings during pultrusion, were beneficial to both tensile strength and weatherability. Other parameters, such as pretensioning of the rovings, were beneficial to weatherability but detrimental to tensile strength. Additives to the resin system were generally detrimental. A high speed tension test method was developed and it was found that the strength of the rod is substantially greater under high loading rates. An approximate relationship was observed between transverse tensile strength and electrical breakdown voltage. However, neither of these characteristics, nor surface hardness, correlated with axial tensile strength or weatherability.

N75-31342/9GA PC$1.00/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Electronic Circuits and Systems: A Compilation.
Technology Utilization.
Jan 75, 30p NASA-SP-5972(02)

Descriptors: *Integrated circuits, *Logic circuits, *Low pass filters, *Optical equipment, *Varactor diode circuits, Hot-wire anemometers, Image tubes, Induction motors, Multiplexing, Q switched lasers, Technology utilization.

For abstract, see STAR 1322

N75-31343/7GA PC$5.25/MF$2.25
Technovators, Silver Spring, Md.
Quasi-Isotropic VHF Antenna Array Design Study for the International Ultraviolet Explorer Satellite.
Final Report:
J. K. Raines. 18 Jul 75, 104p NASA-CR-144663
Contract NAS5-22364

Descriptors: *Antenna arrays, *Antenna design, *Iue, *Very high frequencies, Computer programs, Electromagnetic compatibility, Satellite observation.

For abstract, see STAR 1322

N75-31348/6GA PC$3.75/MF$2.25
AEG-Telefunken, Heilbronn (West Germany). Fachbereich Halbleiter.
Frequency Multiplier 0.1/12 Ghz with MOS Varactors Frequenzvervielfacher 0,1/12 Ghz MIT MOS-Varaktoren.
D. Fritzsche, and H. Shah. Apr 75, 47p BMFT-FB-W-75-02
Contracts BMFT-RFT-2071, GFW-RV-11-TI-4/71
In German; English Summary.

Descriptors: *Frequency multipliers, *Metal oxide semiconductors, *Varactor diode circuits, Frequency stability, Gunn effect, Quartz, Reliability engineering.

For abstract, see STAR 1322

N75-31422/9GA PC$7.00/MF$2.25
Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Freiburg (West Germany). Inst. fuer Angewandte Festkoerpermechanik.
Imaging Technologies for Terminals.
Final Report.
G. Baur, M. Schiekel, and W. Veith. Jun 75, 191p BMFT-FB-T-75-14
Subm-Sponsored by Bundesmin. Fuer Forsch. U. Technol.
In German; English Summary.

Descriptors: *Imaging techniques, *Solid state devices, *Vidicons, Display devices, Electronic transducers, Flat plates, Liquid crystals, Photocathodes, Plasmas (Physics), Television equipment, Video equipment.

For abstract, see STAR 1322

PAT-APPL-592 705/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Dual-Mode Display Device.
Patent Application,
H. E. Rast, and H. H. Casper. Filed 2 Jul 75, 7p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Display systems, Patents, Dual mode, Liquid crystals, Electroluminescence, Phosphorescent materials, Low light levels.
Identifiers: *Liquid crystal display systems, *Patent applications, PAT-CL-350-160.

The patent application describes a dual-mode display device having a liquid crystal display panel and an electro luminescent phosphor backing with means to provide illumination for the liquid crystal display during low ambient light conditions.

PATENT-3 829 788 Not available NTIS
Department of the Navy Washington D C
Electric Power Amplification at Low Frequencies.
Patent,
Robert E. Ford. Filed 21 Dec 72, patented 13 Aug 74, 6p Rept nos. PAT-APPL-317 324,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Power amplifiers, *Patents, Signals, Extremely low frequency.
Identifiers: PAT-CL-330-10.

The patent describes a modulator-demodulator amplifier having high power gain at frequencies from D.C to 200 Hz. The low frequency signal to be amplified is full wave rectified (producing half cycles at tiwce the low frequency) and subsequently used to modulate a higher frequency signal which falls in the band pass of a conventional power amplifier. After amplification, the modulated signal is rectified so as to produce alternate positive and negative half cycles of the original low frequency. The signal is then fed to a low pass filter which retrieves the envelope of the modulated signal which constitutes an amplified version of the low frequency signal.

PATENT-3 829 860 Not available NTIS
Department of the Navy Washington D C
Signal Correlator.
Patent,
Thomas P. Cutler, and Kenneth Dollinger. Filed 25 Jan 71, patented 13 Aug 74, 13p Rept nos. PAT-APPL-109 603,
Government-owned invention available for licensing. Copy of patent available Commis-

sioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Correlators, *Patents, Signals, Coding, Signal processing.
Identifiers: PAT-CL-343-9.

One of the objects of the patent is to perform code correlation simultaneously in two dimensions on an array of stored signals. Another object of the invention is to provide post storage two-dimensional code correlation on a binary or digital basis while preserving the additional analog information carried by the stored signals. A further object of the invention is to digitally correlate for two codes simultaneously after a triply encoded input signal has been precorrelated for one code and stored in a storage matrix. Still another object of the invention is to increase the effective number of cores used in a core storage matrix for doppler signal processing by distributing the input signal over a number of adjacent gated lines without increasing the sampling rate or the actual size of the core matrix.

PATENT-3 831 013 Not available NTIS
Department of the Navy Washington D C
Correlators Using Shift Registers.
Patent,
James M. Alsup, and Harper John Whitehouse.
Filed 20 Feb 73, patented 20 Aug 74, 12p Rept nos. PAT-APPL-333 608,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Correlators, *Patents, Shift registers, Multivibrators, Signals, Signal processing.
Identifiers: PAT-CL-235-181.

An object of the patent is the provision of improved correlators, having a plurality of signal channels and one or more reference channels, whose primary elements are shift registers. Another object is to provide a correlator structure using any number of parallel shift registers, one for the most significant digit, another shift register for the least significant digit, and other shift registers for handling significant digits intermediate in value to these two. Still another object is the provision of a correlator structure adaptable for implementation by integrated circuitry.

PATENT-3 831 055 Not available NTIS
Department of the Navy Washington D C
Raster Display Generator.
Patent,
Frederick L. Eno. Filed 2 Jan 73, patented 20 Aug 74, 5p Rept nos. PAT-APPL-320 045,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Display systems, *Rasters, *Patents, Spectrum analyzers, Oscilloscopes.
Identifiers: PAT-CL-315-27-TD.

The patent describes a raster display generator to display the output of a spectrum analyzer in the form of a raster display on a storage oscilloscope. The generator comprises a step generator wherein a preselected capacitor is charged uniformly in discrete steps, by a constant current generator, one step per sweep of the analyzer, and the resulting D.C. voltage level is superimposed on the spectrum output of the analyzer. The step generator circuit is controlled by the unblanking pulse output of the analyzer so that the capacitor is charged only during the sweep flyback interval, the period of time between the end of one sweep and the start of the next. The unblanking pulse remains at a fixed voltage level during the sweep and goes to zero volts during the flyback interval.

PATENT-3 906 374 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, Calif.
Symmetrical Odd-Modulus Frequency Divider.
Patent.
A. Engel. Patented 16 Sep 75, 5p PAT-APPL-45 053
Misc-Filed 12 Mar. 1974 Supersedes N74-18869 (12 - 10, p 1145). Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of patent available from Commissioner of Patents, Washington, D.C. 20231 $.50.

Descriptors: *Circuit diagrams, *Frequency dividers, *Frequency modulation, Gates (Circuits), *Patents, Ratios, Signal processing, Waveforms.
Identifiers: PAT-CL-328-41.

A frequency divider arrangement is reported that can be used for division by an odd number and which provides a symmetrical output. It comprises an exclusive Or gate followed by a divide by 2N counter where (2N-1) equals the odd number. Input to the exclusive Or gate is from a pulse source and from the counter output.

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A016 411/1GA PC$4.75/MF$2.25
Stanford Research Inst Menlo Park Calif
Analysis of Energy Resources and Programs of the Soviet Union and Eastern Europe. Summary.
Final rept. Feb-Dec 73,
George D. Hopkins, Nick Korens, Richard A. Schmidt, and Carl A. Trexel, Jr. Dec 73, 83p
RADC-TR-74-204-Summ
Contract F30602-73-C-0200, ARPA Order-2339
See also Appendix A, AD-A012 970.

Descriptors: *Energy management, *Energy storage, *Natural resources, Eastern Europe, Resources, USSR, Solid fuels, Coal, Oils, Fuel consumption, Geophysics, Production, Commerce, Global, Energy conservation, Shortages, Economic analysis.
Identifiers: *Energy policy, Energy resources, *National planning and development.

The objective of this study was to conduct an analysis of the energy resources and programs of the Soviet Union and Eastern Europe and their relationship to the rest of the world. A survey was made of energy development technology which included exploration, development, production, distribution, storage and utilization of energy and new forms of energy. Also, an appraisal was made of recent resource recovery and research and development of energy conversion technology, distribution, and utilization efficiency. The economic aspects of energy developments and use were discussed as related to patterns of consumption, trade, and the Gross National Product of the Soviet Union and Eastern European Countries. The overall energy supply and demands of these countries were projected to the 1980 and 1990 time frames. Finally an analysis was made of the Soviet political/military/energy strategy policies relative to the economic impact on Eastern and Western Europe. (Author)

AD-A016 412/9GA PC$7.25/MF$2.25
Stanford Research Inst Menlo Park Calif
Analysis of Energy Resources and Programs of the Soviet Union and Eastern Europe. Appendix B. Coal.
Final rept. Feb-Dec 73,
George D. Hopkins, Nick Korens, Richard A. Schmidt, and Carl A. Trexel, Jr. Dec 73, 219p
RADC-TR-74-204-App-B
Contract F30602-73-C-0200, ARPA Order-2339
See also Appendix C, AD-A016 413.

Descriptors: *Energy management, *Natural resources, *Coal, Energy storage, USSR, Eastern Europe, Energy transfer, Production rate, Commerce, Economic analysis, Geophysics, Energy conservation.
Identifiers: *Energy resources.

The objective of this study was to conduct an analysis of the energy resources and programs of the Soviet Union and Eastern Europe and their relationship to the rest of the world. This appendix discusses in depth the coal resources and recoverable reserves in the Soviet Union and Eastern Europe and provides a perspective for present and projected future energy requirements of these countries.

AD-A016 413/7GA PC$8.50/MF$2.25
Stanford Research Inst Menlo Park Calif
Analysis of Energy Resources and Programs of the Soviet Union and Eastern Europe. Appendix C. Oil.
Final rept. Feb-Dec 73,
George D. Hopkins, Nick Korens, Richard A. Schmidt, and Carl A. Trexel, Jr. Dec 73, 255p
RADC-TR-74-204-App-C
Contract F30602-73-C-0200, ARPA Order-2339
See also Appendix D, AD-A012 971.

Descriptors: *Energy management, *Oils, *Natural resources, Oil consumption, Energy, Storage, USSR, Eastern Europe, Refineries, Transportation, Production rate, Commerce, Geophysics, Economic analysis, Energy conservation, Shortages.
Identifiers: *Energy resources, Energy reserves.

The objective of this study was to conduct an analysis of the energy resources and programs of the Soviet Union and Eastern Europe and their relationship to the rest of the world. This appendix examines the geophysical characteristics of oil deposits in the Soviet Union and estimates the magnitude of Soviet oil resources and reserves and oil resources of Eastern Europe.

PB-242 760-02/GA PC$10.00/MF$10.00
Federal Energy Administration, Washington, D.C. Oil and Gas Statistics Div.
Quarterly Report: Energy Information Reported to Congress as Required by Public Law 93-319. Second Quarter 1975.
1975, 197p
Paper copy also available on subscription $35.00/year domestic, $45.00/year foreign.

Descriptors: *Coal, *Natural gas, *Crude oil, *Electric power generation, *Nuclear energy, *Petroleum products, Nuclear power plants, Electric power plants, Fuel consumption, Production rate, Fuel storage, Reserves, International trade, Exploration, Reviews, Tables(Data), Statistical data.

Resource development, coal, natural gas, crude oil, refined petroleum products, nuclear energy, and electric power are discussed. Topic areas cover such things as demand, reserves, consumption, and international trade.

PB-245 214/2GA PC$7.00/MF$2.25
Pennsylvania Transportation Inst., University Park.
Energy Conservation Through Urban Transportation Planning.
Final rept.,
Roger E. Carrier. Mar 75, 186p* PTI-7515

Descriptors: *Energy conservation, *Urban transportation, Automobiles, Mathematical models, Computerized simulation, Urban planning, Regional planning, Buses(Vehicles), Bicycles, Fuel consumption.
Identifiers: *Transportation models, Bus priority lanes, Carpools.

A large number of techniques for conserving energy in urban passenger transport are described. A systems approach for evaluating these simultaneously in order to formulate areawide passenger transportation energy policy is presented. It consists of a simple computer technique for estimating the conservation value of various schemes. The program is also of value in assessing the energy impact of individual energy conserving programs. Because only local planners are familiar with the economic, environmental, and political constraint on policy and programs, the tool is intended for use in urban regions. It is, however, written in general terms and as such, if used in all urban areas in the U.S., could offer realistic national estimates of urban passenger transportation energy requirements in the short term.

10B. Power Sources

AD-A016 792/4GA PC$3.75/MF$2.25
Delta Electronic Control Corp Costa Mesa Calif
Development of a Low-Cost, Light-Weight, Efficient, 1.5 KW Inverter.
Final rept.,
L. R. Suelzle, and J. S. Suelzle. Sep 75, 48p Rept no. DECC-61098-003
Contract DAAK02-74-C-0388

Descriptors: *Inverters, Lightweight, Low costs.
Identifiers: Design.

The effective use of low-voltage dc power sources, such as fuel cells and batteries, requires efficient power conversion equipment to provide ac voltages. The development of a silent, light-weight inverter is discussed in this paper. The inverter is capable of delivering 1.5 KW into a 0.8-1.0 power factor load at 120 or 240 Vac and at 60 or 400 Hz.

N75-31569/7GA PC$3.25/MF$2.25
North Carolina State Univ., Raleigh. Dept. of Electrical Engineering.
A Theoretical Study of Heterojunction and Graded Band GAP Type Solar Cells.
Semiannual Status Report.
J. R. Hauser, and J. E. Sutherland. Sep 75, 8p
NASA-CR-143439
Grant NSG-1116

Descriptors: *Energy bands, *Semiconductor junctions, *Solar cells, Computer programs, Electric fields, Energy conversion efficiency.

For abstract, see STAR 1322

N75-31571/3GA PC$10.50/MF$2.25
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Benefit-Cost Methodology Study with Example Application of the Use of Wind Generators.
Final Report.
R. P. Zimmer, C. G. Justus, R. M. Mason, S. L. Robinette, and P. G. Sassone. Jul 75, 411p
NASA-CR-134864, A-1645
Contract NAS3-17827

Descriptors: *Cost analysis, *Economic factors, *Energy conversion efficiency, *Energy policy, *Methodology, *Wind (Meteorology), Autorotation, Costs, Decision making, Economic analysis, Social factors, Wind variations, Wind velocity measurement.

For abstract, see STAR 1322

N75-31572/1GA PC$5.25/MF$2.25
Globe-Union, Inc., El Monte, Calif. Centralab Semiconductor.
Effects of Processing on the Carrier Lifetime in Silicon Solar Cells.
P. A. Iles, and S. I. Soclof. Feb 75, 107p NASA-CR-134520
Contract NAS3-15689

Descriptors: *Life (Durability), *Manufacturing, *Minority carriers, *Solar cells, P-n junctions, Semiconductor devices.

For abstract, see STAR 1322

N75-31573/9GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
Technology Survey of Electrical Power Generation and Distribution for Mius Application.
W. L. Gill, and T. E. Redding. Jul 75, 72p NASA-TM-X-58127, JSC-08661

Descriptors: *Data acquisition, *Electric generators, *Electric power, *Energy sources, *Power transmission, Energy budgets.

For abstract, see STAR 1322

10C. Energy Storage

AD-A016 458/2GA PC$4.75/MF$2.25
Lockheed Missiles and Space Co Inc Palo Alto Calif
Advanced Lithium-Water Battery for Electronic Countermeasure Devices.
Final rept. 1 Nov 73-1 Feb 75,
H. F. Bauman. 27 Feb 75, 80p Rept no. LMSC-D409491 AFAPL-TR-75-39
Contract F33615-73-C-2021
See also report dated 26 Nov 73, AD-778 825.

Descriptors: *Primary batteries, Lithium, Water, Electrochemistry, Electrolytes, Temperature, Alkaline batteries, Anodes, Cathodes(Electrolytic cell), Ammonium compounds, Fluorides, Hydrogen peroxide, Electrical conductivity, Efficiency, Lithium alloys, Breadboard models.
Identifiers: *Lithium water cells, *Lithium hydroxide, Ammonium fluorides, Design.

The objective of this effort is to provide advanced battery technology leading to improved primary battery power supplies for Air Force applications. Anode alloys and cathode geometry were evaluated in lithium-water cells. The use of NH4F as a precipitant of LiOH in Li-water cells resulted in constant voltage discharges. Li-H2O cells in breadboard configuration discharged in excess of 45 min. at 1.2 V at 2A/sq in. Li utilization efficiency was greater than 70%. Li cells with H2O2 as cathode reactant delivered 45 min. of discharge at 2.5 V and 2A/sq in. Breadboard batteries discharged at 24 V but at less than design current because of flow equalization problems.

AD-A016 468/1GA PC$5.75/MF$2.25
Eagle-Picher Industries Inc Joplin Mo Electronics Div
Low Rate Lithium Batteries for ECM Expendables.
Final rept. 21 May 73-21 Jul 75,
Robert L. Higgins. Jul 75, 128p AFAPL-TR-75-63
Contract F33615-73-C-2061

Descriptors: *Primary batteries, Electronic countermeasures, Electrodes, Clathrate compounds, Electrolytes, Fluorides, Prototypes.
Identifiers: *Lithium cells, Graphite fluorine clathrates, Carbon monofluoride, Lithium fluoride, Lithium graphite fluoride cells, Design.

This report describes the development and testing of four Li/CF batteries. A 28 volt, 10 ampere-minute battery weighing less than 4 ounces was fully developed, produced and evaluated. The three remaining designs were developed and tested in breadboard configurations. Fully developed batteries were tested at temperatures from -50F to 165F. Results are discussed.

AD-A016 643/9GA PC$3.75/MF$2.25
Defence Research Establishment Ottawa (Ontario)
Lithium Batteries - An Overview.
Technical note,
G. D. Nagy. Oct 74, 26p Rept no. DREO-TN-74-29

Descriptors: *Primary batteries, *Storage batteries, Meetings, Lithium, Electrolytes, Electrodes, Halides, Oxides, Hazards, Reviews, Canada.
Identifiers: High energy batteries, *Lithium cells.

In the search of high-energy density batteries, lithium systems have always been prime candidates because of thier low equivalent weight and high potential. Problems have been concerned with handling and efficient utilization of the active components. The recent advent of promising commercial batteries has demonstrated the viability of lithium systems. This paper reviews some of the promising systems and their problems.

AD-A016 721/3GA PC$3.25/MF$2.25
Defence Research Establishment Ottawa (Ontario)
Charge-Discharge Cycling of DREO Air Electrodes,
William A. Armstrong. Sep 75, 19p Rept no. DREO-R-728

Descriptors: *Storage batteries, Cathodes(Electrolytic cell), Nickel, Porous materials, Silver, Electrocatalysts, Oxygen, Zinc, Air, Mercury, Tetrafluoroethylene resins, Reliability(Electronics), Canada.
Identifiers: Zinc air cells, Metal air batteries, Battery electrodes.

The effects of the composition of the electrode surface in contact with the electrolyte on the ability of an air cathode to withstand the rigours of oxygen evolution during charging have been investigated. Of the compositions studied, a sintered nickel surface containing silver, mercury and PTFE (polytetrafluoroethylene) exhibited the lowest oxygen evolution potential. With a cycle regime consisting of 1 h oxygen reduction at 26 mA/sq cm followed by 2 h oxygen evolution at the same current density, the oxygen reduction potential decreased by 156 mV during 41 cycles.

11. MATERIALS

11A. Adhesives and Seals

COM-75-50606/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Studies of Polymeric Bond Failure on Aluminum Surfaces by X-Ray Photoelectron Spectroscopy (ESCA).
Final rept.,
David M. Wyatt, Robert C. Gray, James C. Carver, David M. Hercules, and Larry W. Masters. Oct 74, 7p
Pub. in Applied Spectroscopy, v28 n5 p439-445 Sep/Oct 74.

Descriptors: *Aluminum, *Adhesive bonding, *Surface properties, Failure, Polymers, Electron microscopy, Photoelectrons, X ray spectroscopy, Peeling.

Identifiers: Reprints, Scanning electron microscopy, Photoelectron spectroscopy.

A study was conducted to demonstrate the utility of X-ray, photoelectron spectroscopy (ESCA) in determining if the failure between polymeric materials and aluminum was cohesive or adhesive. Two polymeric joint sealant materials were cured on cleaned aluminum and then pulled from the surface. The surface of the aluminum from which the polymer had been peeled was studied using ESCA and Scanning Electron Microscopy (SEM) and compared to data obtained from aluminum surfaces which had not been in contact with polymer.

PATENT-3 826 580 Not available NTIS
Department of the Navy Washington D C
Adhesive Dispenser.
Patent,
William H. Bohli. Filed 13 Sep 71, patented 30 Jul 74, 5p Rept nos. PAT-APPL-180 086,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Dispensers, *Adhesives, *Patents, Mixing.
Identifiers: PAT-CL-401-132.

The patent describes a dispenser for applying an adhesive mixture, the constituents of which are contained within the dispenser in the form of small capsules, including a hollow cylindrical housing having a piston member slidably positioned therein and sealingly closing one end thereof. The other end of the housing includes a closure portion having a plurality of bores formed therein, the bores having a diameter of a size smaller than the capsules. Means for moving the piston member are provided which enable the piston member to crush the capsules, mix the adhesive constituent and force the mixture through the bores provided in the closure portion.

11B. Ceramics, Refractories, and Glasses

AD-A016 615/7GA PC$8.75/MF$2.25
California Univ Los Angeles Dept of Materials
An Experimental Study on the Compressive Biaxial Strength of Ceramics.
Final rept. 10 Oct 70-31 Jul 75,
Marc Adams, and George Sines. Aug 75, 299p
Rept no. UCLA-ENG-7537
Contracts N00019-73-C-0294, N00019-72-C-0159

Descriptors: *Alumina, *Ceramic materials, *Compression, *Strength(Mechanics), Compressive properties, Cracks, Cracking(Fracturing), Crack propagation, Brittleness, Polymethyl methacrylate, Fracture(Mechanics), Failure(Mechanics), Three dimensional, Collapse, Tensile strength, Defects(Materials), Test methods.
Identifiers: Biaxial strength, Biaxial stresses.

A mechanical testing program in which the biaxial compressive strength of WESGO AL-995, high strength alumina was measured has shown that the biaxial compressive strength of such material is only slightly affected by the value of the intermediate principal compressive stress. The average value of the compressive strengths measured in all stress states, excluding the equi-biaxial compression stress state, was 528 ksi. The standard deviation of the individual measured strengths was only a few percent of the average values, which is consistent with the predictions of flaw statistics theories. The tensile strengths measured for the material indicate the ratio of compressive strength to tensile strength is approximately 18. It is suggested that the compressive strength of a material is limited by the amount of crack damage which may be sustained in the material without structural collapse occurring. The general aspects of compressive failure are presented which include a description of the micromechanical mechanisms of crack initiation and extension that can operate in a body subjected to purely compressive loading. Three types of flaws are identified which can initiate cracks. The problem of describing crack initiation and extension in three dimensions is addressed. The results of experimental studies of crack extension from three-dimensional, penny-shaped flaws introduced into blocks of polymethylmethacrylate plastic are presented.

AD-A016 656/1GA PC$3.25/MF$2.25
Rensselaer Polytechnic Inst Troy N Y Dept of Materials Engineering
Fracture, Static Fatigue, and Reactions of Water with Glass.
Final rept. 1 Sep 71-31 Aug 75,
R. H. Doremus. Oct 75, 8p
Contract N00014-67-A-0117-0014

Descriptors: *Glass, *Fracture(Mechanics), *Fatigue(Mechanics), Water, Tensile stress, Chemical reactions, Crack propagation, Brittleness.

The main aim of this project has been to learn more about the fracture of glass, particularly as it is affected by reactions with atmospheric water that are accelerated by tensile stress. Delayed failure of soda-lime glass and a glass ceramic were studied in detail, leading to a new theory of static fatigue in glass and discovery of the only known oxide showing no static fatigue. Crack lengths were measured by a new etching technique, which also provided a measure of the crack tip radius and an experimental test of the Griffith Fracture Equation. A discussion of criteria for brittle fracture developed from this work.

AD-A016 720/5GA PC$5.25/MF$2.25
Acurex Corp Mountain View Calif Aerotherm Div
AFRPL Graphite Performance Prediction Program. Volume I. Recommendations for a Standardized Analytic Procedure for MX Nozzle Throat Recession Calculations.
Interim rept. May 74-May 75,
Andrew J. Murphy, Edward K. Chu, and John P. Kesselring. Oct 75, 116p Rept no. Aerotherm-75-143 AFRPL-TR-75-59
Contract F04611-74-C-0023

Descriptors: *Ablation, *Rocket nozzles, *Graphite, *Pyrolitic graphite, *Carbon, Performance tests, Predictions, Flow fields, Boundary layer flow, Reaction kinetics, Heat transfer, Surface properties, Erosion, Computer applications, Mathematical analysis, Plasma generators.

A survey was taken of five solid propellant motor contractors to review current analytic techniques used to predict graphite nozzle material response. Several solutions for a baseline nozzle were conducted and gave similar results for flow field analysis, but not for boundary layer analysis. A sensitivity study was conducted on material response predictions and identified kinetic constants and heat transfer coefficient as the most important variables. Recommendations were provided for development of a standard analysis procedure.

AD-A016 786/6GA PC$4.25/MF$2.25
Acurex Corp Mountain View Calif Aerotherm Div
AFRPL Graphite Performance Prediction Program. Volume II. Arc Plasma Generator Evaluation of Graphite Reaction Kinetics in Rocket Propellant Environments.
Interim rept. May 74-May75,
H. Tong, J. C. Hartman, and E. K. Chu. Oct 75, 60p Rept no. Aerotherm-75-143 AFRPL-TR-75-59-Vol-2
Contract F04611-74-C-0023
See also Volume 1, AD-A016 720.

Descriptors: *Ablation, *Rocket nozzles, *Graphite, *Pyrolytic graphite, *Carbon, Plasma generators, Reaction Kinetics, Performance tests, Predictions, Surface properties, Heat transfer, Boundary layer flow, Gases, Solid rocket propellants, Test methods, Instrumentation, Carbon monoxide, Hydrogen, Water vapor.

Test gases and conditions were selected for use in the arc plasma generation simulation of advanced propellant environments. Calibration and checkout results are reported. The experimental program to determine kinetic reaction rates of carbon and graphite materials will now proceed and be completed in early 1976.

AD-A016 802/1GA PC$5.75/MF$2.25
Hawaii Inst of Geophysics Honolulu
Pressure and Temperature Studies of Glass Properties Related to Vibrational Spectra.
Final rept. 1 Feb 71-31 Dec 74,
Murli H. Manghnani. Dec 74, 137p Rept no. HIG-74-11
Contract N00014-67-A-0387-0012

Descriptors: *Alkali glass, *Fused silica, Titanium oxides, Vibrational spectra, Ultrasonic properties, Silica glass, Thermal expansion, Coefficients, High pressure, Modulus of elasticity, Infrared radiation, Absorption spectra, Attenuation, Elastic properties, Thermal properties, Annealing, Bulk modulus, Poisson ratio, Lithium compounds, Sodium compounds, Potassium compounds, Oxides, Glass, Anomalies.
Identifiers: Alkali metal silicates.

This report concerns the M2O-SiO2 and SiO2-TiO2 glass systems. Elastic, thermal and infrared absorption characteristics of nineteen simple binary M2O-SiO2 glasses, where M is Li, Na or K, have been studied at ambient conditions as well as function of pressure and temperature. M2O content of these glasses ranges from 10 to 45 mole %. Elastic moduli were investigated to 5 kbar and to 300 C, thermal expansivity to 300 C, and infrared absorption to 58.8 kbar. The elastic properties of the M2O-SiO2 glasses vary systematically with composition. Addition of M2O to SiO2 structure causes increase in bulk modulus of all the glasses, decrease in shear and Young's moduli of all but the Li2O-SiO2 glasses, and increase in Poisson's ratio. Low M2O glasses show anomalous elastic behavior under pressure. Effect of phase separation on the elastic properties is not significant; however, their temperature dependence is sensitive to phase separation. Ultrasonic longitudinal and shear wave attenuation are found to be linearly proportional to frequency. The low-temperature attenuation peak found in fused silica at approximatley 47 K broadens and shifts to higher temperature with increase in M2O content.

AD-A016 803/9GA PC$3.75/MF$2.25
Westinghouse Electric Corp Pittsburgh Pa Research and Development Center
Effect of the MgO/SiO2 Ratio on the Strength of Hot-Pressed Si3N4. Interrelation between Creep and Slow Crack Growth. Crack Extension and Arrest: Theory and Experiments for Contact Stress Fields.
Technical rept. nos. 3, 4 and 5 for period ending 15 Oct 75,
C. A. Andersson, F. F. Lange, and J. L. Iskoe. 15 Oct 75, 48p
Contract N00014-74-C-0284, ARPA Order-2697

Descriptors: *Silicon nitrides, *Strength(Mechanics), *Magnesium oxides, *Silicon dioxide, *Creep, *Crack propagation,

*Ceramic materials, *Silicon carbides, Hot pressing, Powders, Ratios, Oxygen, Oxides, High temperature, Grain boundaries, Mechanical properties, Fatigue(Mechanics), Stresses, Impurities, Calcium oxides, Cracks, Failure(Mechanics), Cracking(Fracturing), Brittleness, Bearings.

The strength of hot-pressed Si3N4 containing different MgO/SiO2 molar ratios was studied. Significant increases in strength at 1400 C were observed as the MgO/SiO2 ratio increased to 3-4. Smaller decreases in strength at both 25 C and 1400 C were observed when MgO/SiO2 > 4. These observations are briefly discussed with regard to possible chemistry changes of the grain boundary phase believed to be present in hot-pressed Si3N4. Phenomenological interrelations between creep strain and slow crack growth are derived based on the fact that the total creep strain at fracture is determined by the growth kinetics of a pre-existing crack. It is shown that measurements of the creep strain in a region remote from the growing crack can be used to predict failure periods for materials that concurrently exhibit creep and slow crack growth. Sudden crack extension and arrest is observed when indenters are pressed into the surface of brittle materials. The energitics of this system is examined to determine the criteria for crack extension and arrest. Experimental observations are presented to confirm the first criterion of crack extension and its relation to material properties. The experiments were performed on hot-pressed Si3N4 and SiC.

AD-A016 820/3GA PC$5.25/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
Strength and Fracture Toughness of Binary Alkali Silicate Glasses.
Technical memo.,
Christopher R. Kennedy. 14 Feb 74, 106p Rept no. TM-74-35
Contract N00017-73-C-1418
Doctoral thesis.

Descriptors: *Silica glass, *Alkali metal compounds, *Strength(Mechanics), *Fracture(Mechanics), Surface energy, Elastic properties, Toughness, Hardness, Concentration(Composition), Defects(Materials), Sizes(Dimensions), Equations, Mathematical models, Lithium compounds, Sodium compounds, Potassium compounds, Oxides, Theses.

The strength, modulus of elasticity, fracture surface energy, and their relationship were investigated for a series of alkali silicate glasses ranging in composition from R2O.2SiO2 to R2O.5SiO2, where R2O was either Li2O, Na2O or K2O. Measurements were also made on commercial fused silica. The strengths and fracture surface energies decreased with increasing silica content in all three systems, even though the moduli of elasticity exhibited different trends. In all cases, the strengths varied in an approximately linear manner with the fracture toughness, or (square root of 2E gamma Sub f). No quantitative relationship between the fracture surface energies and the amounts off flow as measured by the microhardness was found to exist. Further, the fracture surface energies were not related to the elastic moduli. Flaw sizes calculated for the annealed Na2O-SiO2 glasses were shown to be related to the sizes of the separated microphase observed by transmission electron microscopy as predicted by Watanabe and Moriya. The flaw sizes for the abraded alkali silicate glasses were shown to be inversely related to the fracture surface energies. Finally, the consistency obtained when calculating the flaw sizes indicates that the strength of glasses is adequately described by a Griffith-Orowan type equation. (Author)

AD-A016 835/1GA PC$3.75/MF$2.25
Battelle Columbus Labs Ohio
Strength-Size Relationships in Ceramic Materials: 1. Investigation of a Commercial Alumina. 2. Effect of Flaw Shape on Strength of Ceramics.
Technical rept. Oct 74-Sep 75,
G. K. Bansal, W. H. Duckworth, and D. E. Niesz. Oct 75, 34p Rept no. TR-4
Contract N00014-73-C-0408
See also report dated Nov 74, AD-A003 012.

Descriptors: *Alumina, *Ceramic materials, *Fracture(Mechanics), Sizes(Dimensions), Crack propagation, Defects(Materials), Fractography, Weibull density functions, Bending stress.

Bend strengths of a commercial sintered alumina, 3M Company's Alsimag 614, are reported. Fracture stresses in specimens differing in each linear dimension by a factor of five were measured at room temperature under environmental conditions which either minimized or enhanced subcritical crack growth prior to catastrophic fracture. Strength was found to be dependent on specimen size under both test conditions. Fractographic identification of strength-controlling flaws, coupled with the analysis of strength-size data, indicated a limited applicability of Weibull's statistical approach.

AD-A016 933/4GA PC$4.75/MF$2.25
Newcastle-Upon-Tyne Univ (England) Dept of Metallurgy and Engineering Materials
Dynamic Fracture Toughness Measurement.
Final technical rept. May 74-Apr 75,
J. Congleton, and B. K. Denton. Jul 75, 84p
Grant DA-ERO-124-74-G0053

Descriptors: *Fracture(Mechanics), *Dynamic tests, Test methods, Crack propagation, Silicon nitrides, Alumina, Magnesium oxides, Bending stress, Ceramic materials, Glass, Polymethyl methacrylate, Steel, Tension, Impact tests, Photography, Great Britain.
Identifiers: Stress intensity factor, Fracture toughness.

An improved crack velocity monitoring procedure able to cope with irregular crack initiation and crack acceleration in ceramics has been developed and used to obtain Kid measurements for silicon nitride, polycrystalline alumina and magnesia. The system allowed extended recording times at fast sweep rates for open-camera single shot oscilloscope work. Velocity data was obtained for three point bend tests on PMMA using surface resistance grids to monitor crack growth and an auto-resistance technique was used for velocity measurements during bend tests on tool steels. For the latter, the data was interpreted using an iterative procedure based on an empirical estimate of the functional dependence of the dynamic potential output. Consistent and reproducible data was obtained using auto-resistive crack length measurements for fast fracture in bending, tension and combined impact-tension tests but the interpretation of the resulting data requires further clarification.

COM-75-50539/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Loss of Chemical Resistance to Aqueous Attack in a Borosilicate Glass Due to Phase Separation.
Final rept.,
Barbara F. Howell, Joseph H. Simmons, and Wolfgang Haller. Aug 75, 3p
Pub. in American Ceramic Society Bulletin, v54 n8 p707-709 Aug 75.

Descriptors: *Heat treated glass, *Borosilicate glass, Durability, Chemical resistance, Phase transformations.
Identifiers: Reprints.

The chemical durability of a borosilicate glass was measured by a powder extraction test (ASTM C 225-68). It was found that a progressive decrease in chemical durability occurred during prolonged heat treatments at temperatures ranging from 29 to 84 degrees below the immiscibility temperature. Following these extreme thermal histories, which are not normally encountered in standard forming and annealing conditions, the amount of extractable alkali increased by as much as 20 fold.

N75-31423/7GA PC$3.25/MF$2.25
Institut Franco-Allemand de Recherches, St Louis (France).
Study by Holographic Interferometry of the Surface Distortion of a Ceramic Plate Due to Bullet Impacts.
F. Albe, P. Smigielski, and H. Fagot. 2 Aug 74, 9p ISL-CO-11/74
Subm-Submitted for Publication. Conf-Presented at the Congr. Of the Intern. Comm. For Opt., Tokyo, 19-23 Aug. 1974.

Descriptors: *Ceramics, *Holographic interferometry, *Surface distortion, Birefringence, Impact, Ruby lasers, Rupturing.

For abstract, see STAR 1322

N75-31910/3GA PC$3.25/MF$2.25
Institut Franco-Allemand de Recherches, St Louis (France).
Progress of Isl Research on Energy Conversion in Ferroelectric Ceramics of the Type PB(Zrixtix)O3 Etat Actuel des Recherches a l'Isl sur les Problemes de Conversion d'Energie a l'Aide de Ceramiques Ferroelectriques du Type PB(Zri-Xtix)O3.
F. Bauer. 22 Oct 74, 8p ISL-29/74
Conf-Presented at the Reunion Franc. De Ferroelectricite, Nantes, France, 27 Sep. 1974. Language in French.

Descriptors: *Ceramics, *Energy conversion, *Ferroelectricity, Electric generators, Lead titanates, Niobates, Phase transformations, Piezoelectricity, Shock waves.

For abstract, see STAR 1322

11C. Coating, Colorants, and Finishes

AD-A016 572/0GA PC$9.50/MF$2.25
Naval Postgraduate School Monterey Calif
Transient Thermal Stress Analysis of Composite Structures Including Continuously Varying Properties.
Master's thesis,
Richard Bailey Bubeck. Sep 75, 344p

Descriptors: *Protective coatings, *Thermal stresses, Ceramic coatings, Metal coatings, Gas turbine blades, Zirconium oxides, Nickel, Nickel alloys, Computer programs, FORTRAN, Finite element analysis, Thermal cycling tests, Transients, Theses.
Identifiers: FORTRAN 4 programming language.

Calculations of transient thermal stress levels were made for composite coatings of hollow cylinders. Stress analysis was done during a thermal cycle of successive heating and cooling periods. Various coating configurations were investigated. The results showed the effect of changes in coating arrangements and the failure modes due to the excessive stress levels. Solutions were obtained by approximate techniques, and a computer program for transient three dimensional thermal stress analysis was developed. The finite element technique was employed for the determination of the temperature distribution and the elastic stress analysis. Fortran IV G Level was used as the programming language.

11D. Composite Materials

AD-A016 303/0GA PC$3.75/MF$2.25
Artech Corp Falls Church Va
Fabrication and Testing of Sapphire Filament Reinforced Superplastic Ni-Cr-Fe Alloy Composites.
Final rept. Jul 73-Feb 75,
Paul J. Lare, Fred Ordway, and Henry Hahn.
May 75, 36p Rept no. J7308-FR
Contract N00019-74-0033
See also AD-774 065.

Descriptors: *Fiber reinforced composites, Sapphire, Filaments, Nickel alloys, Iron alloys, Chromium alloys, Fabrication, Plastic properties, Heat resistant materials.
Identifiers: *Sapphire reinforced composites, Metal matrix composites.

Experimental efforts to fabricate composite samples of a Ni-Cr-Fe alloy reinforced with Al2O3 filaments are described. Sapphire filament/polystyrene layup sheets were sandwiched between sheets of Incoloy 809E matrix and consolidated in a vacuum hot press under conditions at which the matrix demonstrated superplasticity. The resulting samples were evaluated metallographically and, where possible, mechanically for completeness of consolidation. Although the feasibility of consolidation was demonstrated without the use of photochemically etched positioning grooves in the matrix, liminitations of the technique were identified and found related to the hot press die design and load applying components and well as the variability of the sapphire filaments.

AD-A016 309/7GA PC$7.00/MF$2.25
Martin Marietta Aerospace Orlando Fla
Development of Carbon Fiber-Resin Composite Materials for Advanced ABM Structures.
Final rept. Jun 74-Dec 74,
Frank H. Koo, and Howard S. Kliger. Sep 75, 176p Rept no. OR-13625 AMMRC-CTR-75-17
Contract DAAG46-74-C-0127
See also AD-772 667.

Descriptors: *Fiber reinforced composites, Carbon fibers, Reinforced plastics, Rings, Epoxy resins, Shells(Structural forms), Guided missiles, Antimissile defense systems, Airframes, Fabrication, Specifications.
Identifiers: *Carbon fiber reinforced plastics, Graphite reinforced composites, Epoxy matrix composites.

Material specifications and process control specification were developed for carbon fiber-resin composite materials. Hoop ring tests were conducted to evaluate the tensile strength and modulus of Thornel 300/epoxy rings fabricated by wet winding and by prepreg layup techniques. For the cone frustum shell structure of an advanced interceptor, the unidirectional prepreg layup is the recommended fabrication method. Composite lamina angle tests were conducted to provide the relationship of tensile strength, modulus and Poisson's ratio with lamina angles. Thornel 300/Fiberite 934 was the composite material used. Test results show Thornel 300/Fiberite 934 will not provide the stiffness required for the Advanced ABM structure. GY70/epoxy is recommended for the follow-on development.

AD-A016 851/8GA PC$4.75/MF$2.25
Thayer School of Engineering Hanover N H
Elasticity Solutions for Fiber-Reinforced Polymeric Composite Laminates.
Annual rept. 1 Feb 72-31 Jan 73,
Richard D. Schile. Jul 73, 67p AFML-TR-73-115
Contract F33615-72-C-1387

Descriptors: *Elastic properties, *Reinforced plastics, *Laminates, Stresses, Bending, Static tests, Dynamic tests, Continuum mechanics, Deformation, Integral equations, Computer programs, Plates.
Identifiers: BASIC programming language.

The objective of this program is the determination of the state of stress in laminated, rectangular plates in which the individual plies are composed of fiber-reinforced, polymeric material. Both static and dynamic loads are to be considered. The starting point for the analysis is the three-dimensional theory of elasticity. The continuity conditions between plies are taken into account by means of an integral formulation of three-dimensional stress function theory. When the number of laminations is very large, a Correspondence Principle has been derived which relates the stress state in the laminated plate to that in a corresponding, homogeneous, anisotropic plate. For unsymmetrically laminated plates, equations governing the coupled bending and stretching deformation have been derived.

AD-A016 959/9GA PC$3.75/MF$2.25
Cambridge Univ (England) Dept of Engineering
Improving the Impact and Fracture Resistance of Fibrous Composites.
Final technical rept. Aug 74-Aug 75,
Peter W. R. Beaumont, and Vivien Martin. Aug 75, 44p Rept no. CUED/C-Mat/TR.25-1975
Grant DA-ERO-75-G-009

Descriptors: *Reinforced plastics, *Fiber reinforced composites, *Fracture(Mechanics), *Impact strength, Charpy impact tests, Dynamic tests, Flexural strength, Crack propagation, Alignment, Ductility, Carbon fibers, Fiberglass, Epoxy resins, Temperature, Great Britain.
Identifiers: Fracture toughness, Epoxy matrix composites, Carbon fiber reinforced plastics, Fiberglass reinforced plastics.

A three phase program to improve the impact resistance of composite materials was undertaken. In the first phase, the Charpy impact test is investigated as a method for characterising dynamic behavior. The importance of differentiating between the energies of crack initiation and crack propagation is discussed, and a parameter called the Ductility Index is proposed, together with maximum stress and work of fracture for comparing the dynamic fracture behavior of fiber composites. Slow three point bending and instrumented impact tests were carried out to investigate the quasi-static and dynamic fracture behavior of (1) unidirectional fiber composites consisting of carbon and glass fibers embedded in an epoxy resin matrix; (2) cross-ply carbon fiber-reinforced epoxy resin composites, and (3) a carbon fiber/glass fiber/epoxy resin hybrid composite. It was found that fiber hybridization could raise both the fracture stress and toughness, and ductility index of carbon fiber composite materials.

PAT-APPL-571 816/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Varying Density Composite Structure.
Patent Application.
H. Linebarier. Filed 25 Apr 75, 9p NASA-CASE-LAR-11181-1
Contract NAS1-9000
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Composite structures, *Density distribution, *Panels, Fillers, *Patent applications, Product development, Thermodynamic properties.

An apparatus is disclosed which has a cellular core filled with material formed into stratified layers of varying density. The thermal, acoustic, or aesthetic characteristics of the composite structure thus produced may be tailored to suit a variety of design conditions. The method for producing the variable density composite structure is described.

PAT-APPL-588 548/GA PC$3.25/MF$2.25
Department of the Interior, Washington, D.C.
Titanium Diboride Composition.
Patent Application,
Filed 19 Jun 75, 14p DOCKET/MIN-2317
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Composite materials, *Patent applications, Titanium borides, Copper, Nickel, Hot pressing, Fabrication, Mining equipment.
Identifiers: Copper alloy matrix composites, Titanium boride reinforced composites.

In the patent application titanium diboride is composited with about 11 to 13 per cent by weight of copper and about 2 to 4 per cent by weight of nickel, preferably by mixing the constituents in powdered form, heating the mixture to about 2000F, and then hot pressing at a pressure of about 3000 psi and a temperature of about 2650F. The titanium diboride-copper-nickel composite composition possesses excellent strength and non-sparking properties useful in the fabrication of mining tools and implements.

11E. Fibers and Textiles

AD-A016 525/8GA PC$3.25/MF$2.25
Fabric Research Labs Inc Dedham Mass
Exploratory Development of Coated Fabric for Firefighters' Protective Clothing.
Final rept. 1 Apr 74-31 Mar 75,
Norman J. Abbott, T. E. Lannefeld, and R. E. Erlandson. Jul 75, 21p AFML-TR-75-72
Contract F33615-74-C-5117

Descriptors: *Aluminum coatings, *Polyurethane resins, *Thermosetting plastics, *Protective clothing, Wear resistance, Flammability, Heat resistant plastics, Bronze, Copper coatings, Powder metals.
Identifiers: Viton polymers, *Coated fabrics.

The objective of the work was to improve the durability of the aluminized fabric currently used for the outer layer of firefighters' proximity coats. Two possible improvements were developed: (a) Substituting a Viton/bronze coating for the aluminum, and adding a topcoat of pigmented urethane to improve wear resistance; (b) Adding a topcoat of pigmented urethane to the aluminized fabric to improve wear resistance. Sample lengths of both types of coated fabric were produced.

AD-A016 642/1GA PC$3.75/MF$2.25
Royal Aircraft Establishment Farnborough (England)
Effects of Dyes and Finishes on the Weathering of Nylon Textiles.
Technical rept.,
J. E. Swallow. Jan 75, 50p Rept no. RAE-TR-74179 DRIC-BR-46621

Descriptors: *Nylon, *Textiles, *Dyes, *Finishes, *Weathering, Tables(Data), Treatment, Strength(General), Webs(Sheets), Coatings, Great Britain.
Identifiers: Fading.

The results of breaking strength tests of 2503 combinations of treatment and weathering exposure of nylon textiles have been analysed, principally by analysis of variance of ten factorial sets of data. Experiments were made with a range of dyestuffs, different amounts and mixtures of dyestuffs, various control treatments and a number of finishes. Correlations of strength losses with fading of dyestuffs are also reported.

AD-A016 713/0GA PC$3.75/MF$2.25
Royal Aircraft Establishment Farnborough (England)
Some Observations on the Behaviour of Superimposed and Lap Sewn Joints,
M. Webb. Feb 75, 47p Rept no. RAE-TR-74183
DRIC-BR-46833

Descriptors: *Parachute fabrics, *Joining, *Polyester fibers, Performance tests, Great Britain.
Identifiers: Sewing.

Two polyester sewing threads with different breaking strengths were used in the construction of sewn joints in four types of webbing for parachutes. The joints were made having either a 3-point double W stitching pattern of various lengths or a number of rows of transverse stitching. The breaking strength of the stitched joints attained a limiting value. Various methods of seam strength prediction have been investigated.

AD-A016 769/2GA PC$5.75/MF$2.25
Georgia Inst of Tech Atlanta School of Textile Engineering
Development of Polyester/Wool Uniform Fabrics with Improved Durability and Appearance.
Final technical rept. 15 May 72-30 Nov 74,
W. C. Carter, and S. K. Henson. Aug 75, 143p
AFML-TR-75-98
Contract F33615-72-C-1822

Descriptors: *Polyester fibers, *Woolen textiles, Coatings, Abrasion, Composition(Property), Construction, Processing, Wear resistance, Fabrics, Fabrication, Air Force equipment, Strength(General).
Identifiers: *Uniforms, Dyeing, Fibrillation, Pile fabrics.

The mechanism of 'frosting' of polyester/wool uniform fabrics has been established. An exploratory research and development program has been carried out to establish those factors in the composition, construction, and processing of polyester/wool uniform fabrics which contribute to their wearing characteristics, particularly their pilling and frosting behavior. Based on findings, six (6) specification fabrics exhibiting improved wear performance have been prepared for a service test program.

COM-75-11369/6GA PC$5.75/MF$2.25
Clemson Univ., S.C. Dept. of Textiles.
Report of Activities Carried Out Under Contract 4-35963 'Fiber, Textile and Apparel Research - Cotton Polyester Blends' July 1974-75.
Interim rept.,
Robert H. Barker, and J. E. Sirrine. Aug 75, 134p
NBS-GCR-ETIP-75-01
Contract C-4-35963

Descriptors: *Cotton fibers, *Polyester fibers, *Inflammability, *Fire resistant textiles, Additives, Chemical properties, Graft polymerization, Fire resistant coatings, Blends, Tables(Data), Synthetic fibers, Combustion, Thermal stability.

Studies relating to the flame retardant characteristics of the individual fibers are described. The emphasis was placed on polyester. Structural and chemical factors affecting flammability were determined and evaluated. The interaction of polyester with cellulosic fibers was studied in both the presence and absence of flame retardants. Various methods of fixing flame retardants onto polyester were also studied with particular emphasis placed on graft polymerization techniques. Based on the results of these studies, an approach was formulated for treating polyester/cotton blends. A semi-commercial, inherently flame retardant polyester was obtained from DuPont and its utility in blend applications examined. The results from the studies have led to the establishment of general guidelines for the development of new flame retardant systems.

11F. Metallurgy and Metallography

AD-A016 386/5GA PC$3.25/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
The Effect of Pressure of the Corroding Liquid on the Strength of Metals During Low Cycle Fatigue Testing (Vliyanie Davleniya Zhidkoi Korrozionnoi Sredy na Prochnost Metallov pri Ispytanii ikh na Malotsiklovuyu Ustalost),
V. S. Utkin, and L. S. Moroz. 30 Sep 75, 10p Rept no. NISC-Trans-3690
Trans. of Severo-Zapadnyi Zaochnyi Politekhnicheskii Institut, Leningrad. Trudy (USSR) n16 p9-15 1971.

Descriptors: *Corrosion, *Fatigue tests(Mechanics), Alloys, Pressure, Fluid flow, Pipes, Tanks(Containers), Translations, USSR.

A negative effect of different corroding media, including water, on the strength of materials subjected to variable stresses has been known for some time. A large number of industrial equipment (pipes, reservoirs, tanks, etc.) are subjected simultaneously to variable stresses and high pressures produced by corroding liquid media. The performance of structural elements under these conditions is lowered, as well as their useful service life. This work was undertaken to study the effect of the water pressure (0-200 atm) on low cycle fatigue of cylindrical specimens (with a circular cut) made of different alloys.

AD-A016 473/1GA PC$4.75/MF$2.25
California Univ Berkeley Dept of Mechanical Engineering
Deformation Mode of Void-Growth and Coalescence in the Process of Ductile Fracture.
Final rept. May 74-Mar 75,
S. I. Oh, and Shiro Kobayashi. Jul 75, 82p
AFML-TR-75-95
Contract F33615-72-C-1645
See also report dated Aug 74, AD-A001 611.

Descriptors: *Fracture(Mechanics), *Plastic deformation, Mathematical models, Finite element analysis, Stresses, Boundary value problems, Strain(Mechanics), Defects(Materials).
Identifiers: *Metal working, Aluminum alloy 7075.

The objective of this investigation was to develop a fracture criterion applicable to the prediction of the occurrence of cracks in metalworking processes. A model for large void growth was proposed, and the deformation mode was calculated by the elastic-plastic finite-element method. The results of the calculation showed the formation of a shear band between large voids. The proposed fracture criterion is that the growth and coalescence of small voids along this shear band is the final process of fracturing. The fracture strain was estimated for a material by applying the McClintock analysis to small void coalescences. The proposed model offers an explanation for some important aspects of experimental observations of ductile fracture.

AD-A016 684/3GA PC$7.00/MF$2.25
Naval Ship Engineering Center Hyattsville Md
Proceedings of Gas Turbine Materials 1972 Conference Held at the Naval Ship Engineering Center, Hyattsville, Md. in October 1972,
Charles L. Miller. Oct 72, 178p
See also report dated Jun 75, AD-A013 436.

Descriptors: *Corrosion, *Gas turbines, *Marine atmospheres, Meetings, Naval aircraft, Aircraft engines, Cobalt alloys, Nickel alloys, Superalloys, Protective coatings, Turbine parts, Test methods, Electrochemistry, Life tests.

This conference was organized to provide a forum for technically responsible representatives of government and industry to discuss the many facets of sulfidation corrosion and methods of reducing its effects. The major problem encountered in operating gas turbines in the marine environment is sulfidation, which limits engine life and restricts performance improvements. Sulfidation is also a significant problem with naval aircraft jet engines. Programs of common interest to surface ships and aircraft include accelerated salt ingestion testing, non-destructive test techniques, and reprocessing of air-cooled blades and vanes. Materials and coatings which ameliorated engine resistance to the sulfidizing environment were discussed. Testing techniques to determine sulfidation resistance and engine life were presented.

AD-A016 817/9GA PC$3.25/MF$2.25
Clarkson Coll of Technology Potsdam N Y
First-Order Magnetic Phase Transition in Cr-Si Alloys.
Technical rept.,
Sigurds Arajs, K. V. Rao, L. Hedman, and H. U. Astrom. 30 Oct 75, 4p Rept no. TR-6-75
Contract N00014-70-A-0311-0001

Descriptors: *Chromium alloys, *Silicon alloys, *Magnetic alloys, *Binary alloys, Phase studies, Antiferromagnetism.

Studies have clearly confirmed that there are first-order magnetic transitions in the Cr-Si system. The nature of these transitions is not completely clear at the present time. Neutron diffraction investigations are badly needed for further elucidation of the magnetic phase diagram of Cr-Si system. Further analysis of the X vs T data of Cr-Si alloys from the viewpoint of the extended Fedders and Martin theory is in progress.

AD-A016 818/7GA PC$3.25/MF$2.25
Clarkson Coll of Technology Potsdam N Y
Neel Temperatures and Anomalies in Electrical Transport Properties of Antiferromagnetic Binary Chromium Alloys.
Technical rept.,
Sigurds Arajs, Elmer E. Anderson, K. V. Rao, and H. U. Astrom. 1 Nov 75, 5p Rept no. TR-7-75
Contract N00014-70-A-0311-0001

Descriptors: *Chromium alloys, *Binary alloys, *Neel temperature, *Magnetic alloys, Antiferromagnetism, Anomalies, Electrical properties, Transport properties, Electrical resistance.

The Neel temperatures (T sub N) have been determine by the d rho/dT method (where rho is the electrical resistivity and T the absolute temperature) for chromium alloys containing the elements Al, Co, Ge, Ir, Fe, Mo, Ni, Nb, Os, Ru, Si, Ta, Ti, V, and W. The so-called 'well-behaved' solutes Mo, Nb, Os, Ru, Ta, Ti, W, and V, and possibly Si and Ge, behave as expected according to the simple theory by Fedders and Martin. The other solutes exhibit more or less complicated effects which cannot successfully be explained by existing theories of itinerant electron antiferromagnetism. The composition dependence of T sub N for various solutes has been correlated with the detailed behavior of rho in the neighborhood of T sub N. In the case of the 'well-behaved' solutes, the rho data indicate that the commensurable magnetic structure gives rise to large anomalies which are likely due to the magnetic super-zone boundaries. On the other hand, the rho anomalies for incommensurable alloys are small and possibly result from the combined effects of Fermi sur-

face nesting and changes in the scattering relaxation time. (Author)

AD-A016 822/9GA PC$6.25/MF$2.25
Virginia Univ Charlottesville Dept of Materials Science
The Oxidation of Metals,
Kenneth R. Lawless. Jul 74, 169p
Sponsored by Office of Naval Research, Arlington, Va.

Descriptors: *Oxidation, *Metals, Reaction kinetics, Chemisorption, Oxides, Films, Microstructure, Surface properties, Diffusion, Reviews.
Identifiers: Superlattices.

A detailed review of the principles governing the oxidation of metals is presented. The initial stage of the oxidation process involves the chemisorption of oxygen, frequently followed by dissociation and at least partial ionization. Ordered surface adsorption structures occur on many metals, although amorphous structures are found on some metals. Intermediate sub-oxides or 'pseudo-oxides' form prior to the formation of a stable oxide. Considerable oxygen solution occurs in some metals with the formation of internal superlattice domains and sub-oxide platelet structures. Oxide nuclei form at the surface of most metals, the density of nuclei depending on the oxidation temperature and oxygen pressure, and nucleation theory is important for understanding this behavior. The growth of continuous oxide films or scales is considered in terms of various rate limiting processes. A large number of rate laws including linear, parabolic, cubic and quartic as well as logarithmic relations have been derivied. Most of the rate laws derived seem to be satisfactory only over a very limited oxide thickness range.

AD-A016 867/4GA PC$3.25/MF$2.25
Army Materials and Mechanics Research Center Watertown Mass
Monitoring Fatigue Failure of a High Strength Titanium Alloy by Acoustic Emission Techniques.
Final rept.,
Samuel J. Acquaviva, and Richard Chait. Jun 75, 9p Rept no. AMMRC-PTR-75-2
Presented at the NDE Symposium (10th), 23-25 Apr 75, San Antonio, Tex.

Descriptors: *Titanium alloys, *Crack propagation, *Acoustic emissions, *Fatigue tests(Mechanics), Tensile testers, Notch toughness, Notch sensitivity, Fracture(Mechanics), Yield strength, Elongation.

This effort describes the application of acoustic emission techniques to cyclically loaded specimens in an attempt to detect crack initiation. Both notched and unnotched fatigue specimens were cycled at 30 cps in the low cycle fatigue region, i.e., the stress level in each test was above the endurance limit of the material. Fifteen specimens, both notched (K sub T = 4.0) and unnotched, were tested. Results of the tests on the unnotched specimens indicate acoustic emission signals being recorded 30 to 150 cycles prior to fracture; and the crack initiation and propagation phases appear to be quasi-simultaneous as expected in a high strength material. The tests on the notched specimens indicate acoustic emission signals corresponding to crack initiation being recorded as long as 2500 cycles prior to fracture. As a result of this study, it appears that acoustic emission can be a useful technique for detecting material flaws prior to catastrophic failure. (Author)

COM-75-11447/0GA PC$7.00/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
Noble Metal Constitution Diagrams.
Progress rept.,
R. M. Waterstrat, and R. C. Manuszewski. 20 Apr 71, 179p* NBS-10571
Grant PHS-DE-02455
Sponsored in part by American Dental Association, Chicago, Ill. See also COM-75-11448.

Descriptors: *Chromium alloys, *Vanadium alloys, *Platinum alloys, *Iridium alloys, *Rhodium alloys, Phase diagrams, Microstructure, Dental materials, Binary systems(Materials), Solid solutions, Eutectics, Chromium containing alloys, Platinum containing alloys, Iridium containing alloys, Vanadium containing alloys, Rhodium containing alloys.

Four binary constitution diagrams involving the noble metals are presented. These diagrams include the Cr-Pt, Cr-Ir, Cr-Rh and V-Pt alloy systems. Experimental alloys were prepared from starting materials having a nominal purity of at least 99.9% and precautions were taken to insure that no significant contamination was introduced during alloy preparation and heat-treatment. Temperatures were measured to an accuracy within plus or minus 20C.

COM-75-11448/8GA PC$6.25/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
Noble Metal Constitution Diagrams: Part II.
Final rept.,
R. M. Waterstrat, and R. C. Manuszewski. Aug 75, 171p NBSIR-73-415
Grant PHS-DE-02455
Sponsored in part by American Dental Association, Chicago, Ill. and Army Medical Research and Development Command, Washington, D.C.

Descriptors: *Vanadium alloys, *Niobium alloys, *Tantalum alloys, *Ruthenium alloys, *Rhodium alloys, *Osmium alloys, *Palladium alloys, *Platinum alloys, Phase diagrams, Microstructure, Dental materials, Binary systems(Materials), Solid solutions, Eutectics, Vanadium containing alloys, Niobium containing alloys, Tantalum containing alloys, Ruthenium containing alloys, Rhodium containing alloys, Osmium containing alloys, Platinum containing alloys, Palladium containing alloys.

Six binary constitution diagrams involving the noble metals are presented. These diagrams include the V-Ru, V-Rh, Nb-Os, Nb-Pd, Nb-Pt and Ta-Pd alloy systems. Experimental alloys were prepared from starting materials having a nominal purity of at least 99.9% and precautions were taken to insure that no significant contamination was introduced during alloy preparation and heat-treatment. Temperatures were measured to an accuracy within plus or minus 20C.

COM-75-50580/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Anaerobic Corrosion: Metals and Microbes in Two Worlds.
Final rept.,
Warren P. Iverson. 1975, 10p
Pub. in Dev. Industrial Microbiology, v16 p1-10 1975.

Descriptors: *Corrosion, *Anaerobic conditions, Desulfovibrio, Sulfate reducing bacteria, Marine microorganisms, Steels, Oxidizers, Iron cyanides.
Identifiers: Reprints.

The author's investigations of the mechanism of anaerobic corrosion by sulfate-reducing bacteria, which led to the observation that a marine strain produced extracellularly, a strong oxidizing agent which caused extensive corrosion of mild steel under anaerobic conditions, are detailed. The formation of hollow whiskers, structures which resemble fungal mycelium, by the reaction of ferrocyanide or ferricyanide on metals are described.

NTIS/PS-75/785/6GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Stress Corrosion of Steel (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Mona F. Smith. Oct 75, 205p*
See also NTIS/PS-75-786.

Descriptors: *Bibliographies, *Stress corrosion, *Steels, Fractures(Materials), Crack propagation, Tests, Surface finishing, Metal working, Coatings, Deformation, Fatigue(Materials), Nuclear reactor materials, Spacecraft, Aircraft, Abstracts.

The citations cover crack propagation, fracture, tests, surface finishing, working, coatings, deformation and fatigue in relation to stress corrosion. The majority of studies in this report are on nuclear reactor or spacecraft materials. Stainless steel stress corrosion is excluded.

NTIS/PS-75/786/4GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Stress Corrosion of Stainless Steel (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Mona F. Smith. Oct 75, 130p*
See also NTIS/PS-75/785.

Descriptors: *Bibliographies, *Stainless steels, *Stress corrosion, Deformation, Crack propagation, Fractures(Materials), Tests, Additives, Electrochemistry, Hydrogen embrittlement, Chlorides, Nuclear reactor materials, Spacecraft, Abstracts.

This bibliography covers research on deformation, cracking, electro-chemistry, additives, kinetics, test methods and solutions in relation to stress corrosion. A majority of the research concerns nuclear reactor materials and spacecraft components. (Contains 125 abstracts) See also NTIS/PS-75/785, Stress Corrosion of Steel.

N75-31248/8GA PC$4.75/MF$2.25
Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Metallurgy and Materials Science.
The Effect of Microstructure and Strength on the Fracture Toughness of an 18 Ni, 300 Grade Maraging Steel.
J. A. Psioda, and J. R. Low, Jr.. Aug 75, 92p
NASA-CR-143501, TR-7
Contract NGR-39-087-003

Descriptors: *Fracture strength, *Maraging steels, *Microstructure, *Nickel steels, Charpy impact test, Fractography, Mechanical properties, Metallography, Metals, Photomicrography, Voids.

For abstract, see STAR 1322

PAT-APPL-576 393/GA PC$3.25/MF$2.25
Department of the Interior, Washington, D.C.
Process for Recovering Copper from Oxidized Ores.
Patent Application,
Philip R. Haskett. Filed 9 May 75, 13p
DOCKET/MIN-1937
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Copper ores, *Oxidation, *Leaching, *Patent applications, Alkalies, Hydroxides, Carbonates, Hydrometallurgy, Extractive metallurgy, Copper.

The patent application relates generally to the hydrometallurgical recovery of metals from their source materials. More particularly, the present invention relates to the hydrometallurgical recovery of copper from its oxidized ores by using alkaline leaching agents such as strong hydroxide or carbonate solutions.

PAT-APPL-576 400/GA PC$3.25/MF$2.25
Department of the Interior, Washington, D.C.
Fluxless Recovery of Metallic Aluminum from Wastes.
Patent Application,
Dominic Montagna. Filed 9 May 75, 13p*
DOCKET/MIN-2319
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Aluminum, *Materials recovery, *Metal scrap, *Patent application, Solid wastes disposal, Argon, Temperature, Reclamation.
Identifiers: *Metal recycling, Beverage containers.

In the patent application aluminum metal is recovered from processing wastes, such as dross, beverage can scrap and the like, without use of a flux by heating the wastes to a temperature above the melting point of aluminum but below about 800C while maintaining the wastes under a protective gaseous atmosphere which is substantially inert to molten aluminum. After melting of aluminum contained in the wastes is complete, the heated material is agitated gently to agglomerate the molten aluminum and to cause its settling and collection in the bottom of the containment vessel. Molten aluminum is thereafter removed from the vessel leaving a substantially inert residue. Argon is preferred as the protective atmosphere.

PAT-APPL-588 547/GA PC$3.25/MF$2.25
Department of the Interior, Washington, D.C.
Decomposition of Sulfide Minerals.
Patent Application,
W. Lyman Staker. Filed 19 Jun 75, 11p
DOCKET/MIN-2435
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Copper ores, *Leaching, *Patent applications, Chalcopyrite, Transition metals, Chromium inorganic compounds, Vanadium inorganic compounds, Titanium inorganic compounds, Acids, Extractive metallurgy.

In the patent application chalcopyrite ore or concentrate is decomposed by reacting with an aqueous acid solution of a transition metal ion in a lower valence state, the metal being from the group consisting of chromium, vanadium and titanium.

PAT-APPL-591 743/GA PC$3.25/MF$2.25
Department of the Interior, Washington, D.C.
Decomposition of Sulfide Ores.
Patent Application,
Gary A. Smyres, Philip R. Haskett, Bernard J. Scheiner, and Roald E. Lindstrom. Filed 30 Jun 75, 10p DOCKET/MIN-2426
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Sulfide minerals, *Chlorination, *Patent applications, Oxidation, Zinc, Lead, Copper, Cadmium, Silver, Nickel, Cobalt, Extractive metallurgy.

In the patent application complex sulfide ores or concentrates are decomposed by treatment with a combination of chlorine and oxygen, the amount of chlorine being limited to that necessary to convert sulfides of the desired metals, such as zinc, lead, copper, cadmium, silver, nickel and cobalt to chlorides.

PATENT-3 877 932 Not available NTIS
Department of the Interior, Washington, D.C.
Pressure Cementation Process for Recovery of Copper from Solution.
Patent,
Carl H. Elges, III. Filed 21 Feb 74, patented 15 Apr 75, 4p PAT-APPL-444 575,
Also includes report no. DOCKET/MIN-2025.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Precipitation(Chemistry), *Patents, *Copper, *Iron, Sulfuric acids, Leaching, Hydrogen, Pressure.
Identifiers: PAT-CL-75-109, *Cementation.

According to the patent, copper is recovered from acidic aqueous solutions containing cupric, ferric, ferrous and other ions by a cementation reaction with elemental iron. The cementation step is performed under hydrogen pressure which minimizes iron consumption and allows the cementation treatment of highly acidic solutions.

PB-245 325/6GA PC$4.25/MF$2.25
Utah Univ., Salt Lake City.
Advanced Chemical Processing of Copper Sulfide Concentrates.
Progress rept. 1 Sep 73-30 Apr 74,
Milton E. Wadsworth, Ferron A. Olson, and Jan D. Miller. 15 Jun 74, 51p NSF/RA/T-74/045
Prepared in cooperation with Martin Marietta Corp., Baltimore, Md. Baltimore Div.

Descriptors: *Chalcopyrite, *Copper, *Leaching, *Roasting, Communition, Copper ores, Tumbling, Reduction(Chemistry), Iron, Oxidation, Extractive metallurgy, Vibration, Hydrogen, Temperature.

Two studies appear to be promising for the conversion of chalcopyrite concentrates to Cu2S. The first is combined leaching and attrition in vibratory and tumbling mills. In preliminary studies conducted at about 100 degrees C, during thirty minutes of leaching it appeared that all of the ferric sulfate lixiviant was consumed and that about 30% of the chalcopyrite concentrate was dissolved. Preliminary results indicate that many of the problems heretofore found in direct acid leaching of chalcopyrite due to the slow leaching rate might be overcome by the simultaneous use of extensive attrition with leaching. The second promising study is low and high temperature reduction roasting of chalcopyrite followed by ferric sulfate leaching. Oxidation roasting at 350 degrees C produced a product from which nearly 80% of the Cu was readily extracted during the leaching. Chalcopyrite reduced with hydrogen at 800 to 850 degrees C produced a product which leached as readily and completely as the oxidation process.

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A016 841/9GA PC$4.25/MF$2.25
Carnegie-Mellon Univ Pittsburgh Pa Dept of Mechanical Engineering
Wear Mechanics in High Speed Sliding Contact.
Annual rept. no. 1, Jun 74-Aug 75,
R. Komanduri, and M. C. Shaw. Sep 75, 67p
Contract N00014-67-A-0314-0025

Descriptors: *Wear, *Sliding contacts, Abrasives, Grinding, Lubricants, Phase transformations, Molybdenum compounds, Boron nitrides, Graphite, Crystal structure, Carbides, Machines.
Identifiers: Molybdenum sulfides.

The concept of hard particles generation and growth due to possible crystal transformation of layered type hexagonal structured materials such as graphite, molybdenum disulfide and boron nitride, at high temperatures, concomitant high pressure and in presence of a suitable catalyst-solvent material, in high speed sliding is introduced. The mechanism of galling of polyphase materials in high speed sliding contact based on continuous depletion of second phase strengthening carbides from the matrix is presented and verified experimentally. The mechanism of sphere formation of fine chips generated in high speed sliding based on curling of chips due to a bending moment and subsequent bonding of many such curved chips into a sphere due to the curved platelets being highly polarized, is presented and qualitatively verified experimentally.

11I. Plastics

AD-A016 474/9GA PC$3.75/MF$2.25
Air Force Materials Lab Wright-Patterson AFB Ohio
Inferring Mechanical Relaxation Spectra, An Ill-Posed Problem.
Final rept. May-Oct 74,
D. R. Wiff, and Matatiahu Gehatia. May 75, 34p
Rept no. AFML-TR-74-243

Descriptors: *Viscoelasticity, *Stress relaxation, *Plastics, *Composite materials, Polymers, Test methods, Molecular structure, Mathematical analysis, Boundary value problems, Elastic properties, Quadratic programming, Mechanical properties, Computer applications.

An effort is made to reduce the number of required mechanical measurements on resin, plastic, and composite specimens. This is achieved by proposing a technique for handling the ill-posed problem of determining a mechanical structural model of a specimen. The results are very encouraging. The report describes in detail the mathematical approach but also presents illustrative graphs comparing assumed mechanical relaxation distributions with those inferred from computer generated experimental data.

AD-A016 843/5GA PC$7.25/MF$2.25
National Bureau of Standards Washington D C Inst for Materials Research
Proceedings of Piezoelectric and Pyroelectric Symposium-Workshop Held at Gaithersburg, Maryland on April 15 and 16, 1975.
Final rept.,
Martin G. Broadhurst. Sep 75, 223p Rept no. NBSIR-75-760

Descriptors: *Pyroelectricity, *Piezoelectricity, *Polymers, *Electrets, *Meetings, Polarization, Crystal structure, Deformation, Films, Thermal properties, Dielectrics, Crystallization, Measuring instruments, Ferroelectricity, Dipole moments, Radiometers, Piezoelectric transducers, Hydrophones.
Identifiers: Vinylidene fluoride polymers, Polyvinyl fluoride.

Contents: Piezoelectricity in polarized polyvinylidene fluoride; Piezoelectric polymer research in Japan; The melting temperature-composition curves of poly(vinylidene fluoride)-poly (vinyl fluoride) mixtures and vinylidene fluoride-vinyl fluoride copolymers; Texture and pyroelectricity in polyvinylidene fluoride; Dependence of the piezoelectric activity of polyvinylidene fluoride upon high speed uniaxial stretching and subsequent poling; Thermally stimulated currents and morphology in PVF2; Piezoelectricity and pyroelectricity in a poly(vinylidene fluoride-tetrafluoroethylene copolymer; Polyvinylidene fluoride as an active device element; Scanning for ferroelectricity in polycrystalline materials; Origins of persistent electrical polarization in polymer solids;

Pyroelectric polymers applied to optical radiation measurements; Pyroelectricity in PVF2; Preliminary investigations of piezoelectric polymers; Piezoelectric polymer measuring instruments.

AD-A016 844/3GA PC$4.25/MF$2.25
National Bureau of Standards Washington D C Inst for Materials Research
Piezo- and Pyroelectric Properties of Electrets.
Final rept. 1 Jan-31 Dec 75,
Martin G. Broadhurst, and G. Thomas Davis.
Oct 75, 54p Rept no. NBSIR-75-787
See also report dated 1 Mar 73, AD-758 730.

Descriptors: *Electrets, *Polymers, Dipole moments, Piezoelectric effect, Pyroelectricity, Dielectrics, Tensor analysis, Thermodynamics, Amorphous materials, Ferroelectric materials, Molecular structure, Mathematical models, Films, Stresses, Strain(Mechanics), Orientation(Direction), Polyvinyl chloride, Space charge.
Identifiers: Polyvinyl fluoride, Vinylidene fluoride resins.

A model for piezo- and pyroelectricity in polymers is presented. These effects are true piezo- and pyroelectricity rather than electrostriction, conduction, electromechanical effects or the motion of conductors in the field of space charges. Two distinct types of polymers can be piezoelectric. Amorphous polymers are piezo- and pyroelectric by virtue of a non-equilibrium but kinetically stable net dipole orientation. The semicrystalline polymers are piezoelectric due to alignment of polar, ferroelectric crystals dispersed in the amorphous phase. In both types the magnitudes of the piezo- and pyroelectric effects are in accord with the expected temperature and pressure dependence of the dipolar polarization. Space charges embedded in the polymer normally will not produce a piezo- or pyroelectric current. Those embedded near the crystal-liquid interfaces tend to reduce the piezo- and pyroelectricity. Improved orientation of dipoles and reduction of ionic impurities should increase p and d for PVF2 by a factor of three above typical values presently reported. The sensitivity of amorphous polymers is limited mainly by dipole moment per unit volume and breakdown strength.

COM-75-11436/3GA PC$7.25/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
Proceedings of Piezoelectric and Pyroelectric Symposium-Workshop Held at Gaithersburg, Maryland on April 15 and 16, 1975.
Final rept.,
Martin G. Broadhurst. Sep 75, 223p NBSIR-75-760

Descriptors: *Pyroelectricity, *Piezoelectricity, *Polymers, *Electrets, *Meetings, Polarization, Crystal structure, Deformation, Films, Thermodynamic properties, Dielectrics, Crystallization, Dipole moments, Measuring instruments, Ferroelectricity, Radiometers, Piezoelectric transducers, Hydrophones.

Contents: Piezoelectricity in polarized polyvinylidene fluoride; Piezoelectric polymer research in Japan; The melting temperature-composition curves of poly(vinylidene fluoride)-poly(vinyl fluoride) mixtures and vinylidene fluoride-vinyl fluoride copolymers; Texture and pyroelectricity in polyvinylidene fluoride; Dependence of the piezoelectric activity of polyvinylidene fluoride upon high speed uniaxial stretching and subsequent poling; Thermally stimulated currents and morphology in PVF2; Piezoelectricity and pyroelectricity in a poly(vinylidene fluoride-tetra-fluoroethylene) copolymer; Polyvinylidene fluoride as an active device element; Scanning for ferroelectricity in polycrystalline materials; Origins of persistent electrical polarization in polymer solids; Pyroelectric polymers applied to optical radiation measurements; Pyroelectricity in PVF2; Preliminary investigations of piezoelectric polymers; Piezoelectric polymer measuring instruments.

COM-75-11471/0GA PC$4.25/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
Piezo- and Pyroelectric Properties of Electrets.
Final rept. 1 Jan-31 Dec 75,
Martin G. Broadhurst, and G. T. Davis. Oct 75, 55p NBSIR-75-787
Sponsored in part by Office of Naval Research, Arlington, Va.

Descriptors: *Electrets, *Polymers, *Piezoelectricity, *Pyroelectricity, Dielectrics, Tensor analysis, Thermodynamics, Ferroelectric materials, Molecular structure, Mathematical models, Films, Stresses, Polyvinyl chloride, Polyvinyl fluoride, Vinylidene resins, Space charge, Strains, Orientation, Crystal structure, Dipole moments.
Identifiers: Vinylidene fluoride resins, Amorphous materials.

A model for piezo- and pyroelectricity in polymers is presented. These effects are true piezo- and pyroelectricity rather than electrostriction, conduction, electromechanical effects or the motion of conductors in the field of space charges. Two distinct types of polymers can be piezoelectric. Amorphous polymers are piezo- and pyroelectric by virtue of a non-equilibrium but kinetically stable net dipole orientation. The semicrystalline polymers are piezoelectric due to alignment of polar, ferroelectric crystals dispersed in the amorphous phase. In both types the magnitudes of the piezo- and pyroelectric effects are in accord with the expected temperature and pressure dependence of the dipolar polarization. Space charges embedded in the polymer normally will not produce a piezo- or pyroelectric current. Those embedded near the crystal-liquid interfaces tend to reduce the piezo- and pyroelectricity. Improved orientation of dipoles and reduction of ionic impurities should increase p and d for PVF2 by a factor of three above typical values presently reported. The sensitivity of amorphous polymers is limited mainly by dipole moment per unit volume and breakdown strength.

11L. Wood and Paper Products

NTIS/PS-75/798/9GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Pine Wood Applications (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
Robena J. Brown. Oct 75, 70p*

Descriptors: *Pine wood, *Bibliographies, Wood preservatives, Fungus proofing, Structural properties, Lumbering, Surface defects, Market value, Cost analysis, Softwoods, Wood products, Structural timber, Quality, Adhesives, Density(Mass/volume), Pallets.
Identifiers: Southern pines.

The bibliography covers research conducted on pine wood. Wood properties for best utilization for furniture and wooden structures are covered. Tests for acceptability for particle boards, plywood, and veneers are included. Wood preservatives and treatments are also described. (Contains 65 abstracts)

PB-245 586/3GA PC$3.25/MF$2.25
Western Forest Products Lab., Vancouver (British Columbia).
Protecting Packaged Kiln-Dried Lumber with Water Repellents,
J. W. Roff, J. F. G. Mackay, and A. J. Cserjesi.
May 75, 16p VP-X-146

Descriptors: *Lumber, *Waterproofing, Waterproof coatings, Spraying, Effectiveness, Fir wood, Wetting agents, Test methods, Canada.
Identifiers: Hemlock wood.

A newly formulated, fungicidal, wax-based water repellent, applied by spray to kiln-dried hem-fir dimension lumber, controlled moisture uptake and sap stain and mould for three months in a package stored under water sprinklers. Only 8% of the pieces increased to more than the 20% moisture-content level. When applied by dipping, with a wetting agent added to improve coverage, the water repellent was ineffective.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A016 294/1GA PC$3.25/MF$2.25
California Univ Berkeley
How Far Should You Go with the Lanczos Process.
Final rept.,
W. Kahan, and B. Parlett. Sep 75, 17p
Contract N00014-69-A-0200-1017
Report on Sparse Matrix Computations.

Descriptors: *Matrices(Mathematics), Eigenvectors, Computations, Computer applications, Algorithms, Theorems.
Identifiers: *Lanczos method, Eigenvalues, Sparse matrices.

The Lanczos algorithm can be used to approximate both the largest and smallest eigenvalues of a symmetric matrix whose order is so large that similarity transformations are not feasible. The algorithm builds up a tridiagonal matrix row by row and the key question is when to stop. An analysis leads to a stopping criterion which is inspired by a useful error bound on the computed eigenvalues.

AD-A016 312/1GA PC$3.25/MF$2.25
California Univ San Diego La Jolla Inst of Geophysics and Planetary Physics
Asymptotic Approximations for Oblate Spheroidal Wave Functions,
John W. Miles. 29 Nov 74, 23p
Contract N00014-69-A-0200-6005, Grant NSF-GA-35396
Availability: Pub. in Philips Research Reports, 30 p140-160 1975.

Descriptors: *Approximation(Mathematics), *Wave functions, *Spheres, *Asymptotic series, Algorithms, Reprints.
Identifiers: Wavenumber.

Uniformly valid (with respect to the independent variable) asymptotic approximations to the oblate spheroidal wave functions are constructed for large values of the wavenumber c.

AD-A016 348/5GA PC$3.75/MF$2.25
Wisconsin Univ Madison Mathematics Research Center
Effect of Discontinuous Boundary Conditions on Finite-Difference Solutions.
Summary rept.,
J. Barkley Rosser. Jun 75, 43p Rept no. MRC-TSR-1383
Contract DA-31-124-ARO(D)-462

Descriptors: *Finite difference theory, Boundary value problems, Approximation, Theorems, Numerical integration.
Identifiers: *Laplace equation.

If one is solving a Laplace differential equation by the standard 5-point or 9-point difference approximation, a discontinuity of the boundary values will cause the approximate solution to be in error in the interior. The amount and nature of these errors is discussed, and it is shown that a properly chosen 9-point approximation yields greater accuracy than a 5-point approximation for certain problems of this type.

AD-A016 349/3GA PC$4.25/MF$2.25
Wisconsin Univ Madison Mathematics Research Center
Calculation of Potential in a Sector, Part I.
Summary rept.,
J. Barkley Rosser. May 75, 70p Rept no. MSR-TSR-1535
Contract DA-31-124-ARO(D)-462

Descriptors: *Boundary value problems, *Potential theory, Approximation, Integral equations, Theorems.
Identifiers: *Harmonic functions.

More and more practical problems are requiring the solution of potential problems in L-shaped regions, T-shaped regions, and worse. There seems still a dearth of wholly satisfactory means for getting numerical approximations in these cases. The present report will provide a useful tool for getting such numerical approximations; it will also provide a better theoretical understanding of the problems. The tool developed in this report is to provide means for the rapid calculation of u(x,y) at points inside a sector if u(x,y) is a harmonic function which is required to assume given values around the boundary. For the present Part I, these boundary values are required to be quite smooth.

AD-A016 353/5GA PC$4.25/MF$2.25
Wisconsin Univ Madison Mathematics Research Center
On Reid's Characterization of the Ternary Matroids.
Summary rept.,
Robert E. Bixby. Jul 75, 61p Rept no. MRC-TSR-1560
Contract DA-31-124-ARO(D)-462

Descriptors: *Algebraic topology, Matrices(Mathematics), Set theory, Theorems.
Identifiers: *Matroids, *Homotopy theory.

In this paper the author proves a stronger version of a result of Ralph Reid characterizing the ternary matroids (i.e., the matroids representable over the field of 3 elements, GF(3)). In particular it is proven that a matroid is ternary if it has no series-minor of type (L sub n) for n = or > (n cells and n circuits, each of size n-1), and no series-minor of type (L* sub 5) (dual of (L sub 5), BII (Fano matroid) or BI (dual of type BII).

AD-A016 375/8GA PC$3.25/MF$2.25
Naval Postgraduate School Monterey Calif
Numerical Performance of Matrix Inversion with Block Pivoting.
Master's Thesis,
Gerald G. Brown. Aug 75, 22p Rept no. NPS-55Zr75081

Descriptors: *Computer applications, *Matrices(Mathematics), *Mathematical programming, Computations, Memory devices, Algorithms.
Identifiers: *Matrix inversion, Computer storage management, Paging.

An experiment with matrix inversion using block pivots is presented. Large scale matrix computations can often be performed more efficiently by use of partitioning. Such matrix manipulation lends itself to paged or cache memory systems since computation is staged to be completely performed in local blocks of controllable size. On other systems retrieval overhead can be balanced with computation for 'in-memory/out-of-memory' applications. Parallelism in such schema leads to efficient utilization of some multiple processor environments. Timing results indicate, however, that choice of block size should not necessarily be dictated by hardware page size for most efficient operation and that classical methods of estimating computation times are not always adequate.

AD-A016 424/4GA PC$3.25/MF$2.25
Rand Corp Santa Monica Calif
Cardinal Utility from Intensity Comparisons.
Interim rept.,
Lloyd S. Shapley. Jul 75, 24p Rept no. R-1683-PR
Contract F44620-73-C-0011

Descriptors: *Decision theory, *Nonparametric statistics, Comparison, Sequences(Mathematics), Ranking, Decision making, Optimization, Measurement.
Identifiers: *Utility theory.

A proof that a cardinal utility function is determined if changes between outcomes, as well as the outcomes themselves, can be ranked in order of desirability. It is assumed that a numerical ordinal utility function with convex range is already given, and that the ranking of changes is continuous and enjoys a certain 'crossover' property that is characteristic of difference comparisons. (Author)

AD-A016 445/9GA PC$3.25/MF$2.25
Naval Postgraduate School Monterey Calif
Regression Analysis with Correlated Observations.
Master's thesis,
Kyu Ryun Chung. Sep 75, 25p

Descriptors: *Regression analysis, Estimates, Random variables, Matrices(Mathematics), Theorems, Theses.

The regression model Y = XB + e, with e equivalent to N(0, sigma squared), has been studied extensively. That is, the model in which the errors are independent and identically distributed as N(0, sigma squared) has been studied already. In this thesis the author studies the model in which the sample observations are correlated with a prescribed correlation structure and shows that many of the results available for the independent case apply equally well for the correlated samples. It is found that some results obtained here are not just the same as the case where the errors are independent and identically distributed as N(0, sigma squared).

AD-A016 496/2GA PC$5.75/MF$2.25
Rand Corp Santa Monica Calif
The Foundations of Probability and Mathematical Statistics,
Gus W. Haggstrom. Mar 75, 142p Rept no. P-5394

Descriptors: *Statistical analysis, *Probability, Probability density functions, Sampling, Normal density functions, Hypergeometric functions, Estimates, Least squares method, Theorems.
Identifiers: Binomial density functions, Poisson density functions, Lognormal density functions, Gamma function, Parameter estimation, Maximum likelihood estimation.

These notes were written for an introductory course in probability and statistics at the post-calculus level that was presented during the fall term of 1974 to students in the Rand Graduate Institute. Most of the material is devoted to the basic concepts of probability theory that are prerequisite to learning mathematical statistics: probability models, random variables, expectation and variance, joint distributions, conditioning, correlation, and sampling theory. Among the distributions treated are the binomial, hypergeometric, Poisson, negative binomial, normal, gamma, lognormal, chi-square, and bivariate normal. The last section of the notes provides an introduction to some of the basic notions of parameter estimation: bias, efficiency, sufficiency, completeness, consistency, maximum likelihood, and least-squares estimation. Proofs of the Rao-Blackwell, Lehmann-Scheffe, and Gauss-Markov Theorems are included.

AD-A016 509/2GA PC$3.25/MF$2.25
North Carolina Univ At Chapel Hill Dept of Statistics
The Measurability of a Stochastic Process of Second Order and its Linear Space,
Stamatis Cambanis. 4 Sep 73, 11p AFOSR-TR-75-1244
Grant AF-AFOSR-1415-68
Availability: Pub. in Proceedings of the American Mathematical Society, v47 n2 p467-475 Feb 75.

Descriptors: *Stochastic processes, Modification, Autocorrelation, Orthogonality, Integral equations, Oscillation, Reprints.
Identifiers: Linear space, Second order martingales.

It is of considerable theoretical and practical interest to know whether a stochastic process has a measurable modification. For the important class of second order processes, simple necessary and sufficient conditions for the existence of a measurable modification are given in terms of the autocorrelation of the process and the separability of its reproducing kernel Hilbert space or its linear space. It is shown that weakly continuous processes, processes with orthogonal increments and second order martingales always have measurable modifications. Also necessary and sufficient conditions are given in terms of integral representations for the linear space of a second order process to be separable. As a consequence it is shown that a second order process is oscillatory if and only if its linear space is separable. (Author)

AD-A016 511/8GA PC$3.25/MF$2.25
Rice Univ Houston Tex Dept of Mechanical and Aerospace Engineering and Materials Science
New Transformation Technique for Optimal Control Problems with Bounded State. Part II. Examples,
A. Miele, and J. R. Cloutier. 16 Dec 74, 7p
AFOSR-TR-75-1444
Grant AF-AFOSR-2185-72
Condensation of Rept. no. AAR-123 dated 1974, AD-A004 334. See also Part 1, Rept. no. AAR-122 dated 1974, AD-A004 333.
Availability: Pub. in I-Aerotecnica Missili e Spazio, n3 p177-186 Jun 75.

Descriptors: *Control theory, Transformations(Mathematics), Boundary value problems, Numerical integration, Optimization, Algorithms, Convergence, Reprints.
Identifiers: *Gradient restoration algorithms.

In Ref 1, Miele and Cloutier developed a new transformation technique for optimal control problems with bounded state. This transformation technique was employed in conjunction with the sequential gradient-restoration algorithm. In this paper, three numerical examples are presented, one pertaining to the fixed-final-time case and two pertaining to the free-final-time case. The numerical results show the rapid convergence characteristics of the algorithm discussed in Ref 1. (Author)

AD-A016 522/5GA PC$3.25/MF$2.25
Stanford Univ Calif

A General Bayes Rule and Its Application to Nonlinear Estimation.
James Ting-Ho Lo. 12 Oct 73, 12p ARO-5328.13-M
Contracts DA-31-124-ARO-(D)-394, N00014-67-A-0298-0006
Availability: Pub. in Information Sciences, v8 p189-198 1975.

Descriptors: *Estimates, *Bayes theorem, Nonlinear analysis, Vector spaces, Reprints.
Identifiers: *Bucy representation theorem, Conditional probability, Random processes, Translation theorem, Nonlinear processes, State space, Representation, Unit circles.

This paper consists of two main results, a general Bayes rule, and a general Bucy representation theorem. The general Bayes rule is a natural generalization of the elementary Bayes rule: P(A/B)/P(A)=P(B/A)/P(B). The general Bucy representation theorem plays a central role in nonlinear estimation theory as does the Bucy theorem in nonlinear filtering. A simple and direct proof of the general Bucy representation theorem is obtained by the application of the general Bayes rule. (Author)

AD-A016 558/9GA PC$3.25/MF$2.25
California Univ Los Angeles Western Management Science Inst
On Dynamic Programming with Unbounded Rewards,
Steven A. Lippman. Oct 73, 11p Rept no. WMSI-Reprint-133
Grant AF-AFOSR-2349-72
Availability: Pub. in Management Science, v21 n11 p1225-1233 Jul 75.

Descriptors: *Dynamic programming, *Markov processes, *Decision theory, *Economic models, *Inventory control, *Stochastic processes, Control theory, Optimization, Functional analysis, Equations, Reprints.
Identifiers: Unbounded rewards.

Using the technique employed by the author in an earlier paper, the existence of an optimal stationary policy that can be obtained from the usual functional equation is again established in the presence of a bound (not necessarily polynomial) on the one-period reward of a semi-Markov decision process. This is done for both the discounted and the average cost case. In addition to allowing an uncountable state space, the law of motion of the system is rather general in that it is permitted for any state to be reached in a single transition. There is however, a bound on a weighted moment of the next state reached. Finally, the process indicates the applicability of these results.

AD-A016 581/1GA PC$4.75/MF$2.25
California Univ Berkeley Electronics Research Lab
The Rayleigh Quotient Iteration for Non-Normal Matrices.
Final scientific rept.,
Nai-fu Chen. 2 Oct 75, 84p Rept no. ERL-M548
Contract N00014-69-A-0200-1017
Doctoral thesis.

Descriptors: *Matrices(Mathematics), *Iterations, Eigenvectors, Computations, Convergence, Theorems, Theses.
Identifiers: Eigenvalues, *Rayleigh quotient iteration.

The Rayleigh Quotient Iteration (RQI) is a method for computing eigenvectors and eigenvalues of a square matrix. The behaviour, both local and global, of RQI with symmetric and normal matrices is almost completely understood. The vector sequence converges for almost all starting vectors. In this paper, the author investigates the global properties of RQI on non-normal matrices. Results on nearly normal matrices with real eigenvalues are obtained, and at the other extreme, results on completely degenerate matrices are also obtained. In particular, the question of global convergence of the vector iteration on a general matrix is reduced to the convergence of the scalar sequence of the Rayleigh quotients. In practice, the vector iteration always converges. The main difficulty in the degenerate case is that the iteration function is discontinuous near the eigenvector. An example is used to display the sectorial behaviour of the iteration. Further the author constructs a sequence of numbers that converges to the eigenvalue. Yet if the numbers are used as shifts with inverse iteration, the vector sequence fails to converge.

AD-A016 582/9GA PC$3.25/MF$2.25
Naval Research Lab Washington D C
Vectorization of Recursion Relations.
Final rept.,
Jay P. Boris. Oct 75, 9p Rept no. NRL-MR-3144
Sponsored in part by Energy Research and Development Administration, Washington, D.C.

Descriptors: *Recursive functions, *Computations, Algorithms, Parallel processing.
Identifiers: Vector computers.

Techniques for efficient vectorization of the simple recursive relation (x sub j) = (a sub j)(x sub (j-1)) + (d sub j) and the tridiagonal series of equations (a sub j)(x sub (j-1)) + (b sub j)(x sub J) + (c sub j)(x sub (j+1)) = (d sub j) are presented. Both problems are solved by a folding procedure similar to that used in computing the fast Fourier transform. The tridiagonal algorithm is a generalized form of the cyclic-reduction technique used by Hockney and Buneman.

AD-A016 594/4GA PC$3.75/MF$2.25
Stanford Univ Calif Dept of Statistics
Bayes Linear Estimators of the Intensity Function of the Nonstationary Poisson Process.
Technical rept.,
M. Lawrence Clevenson, and James V. Zidek. 4 Aug 75, 34p Rept no. TR-222
Contract N00014-67-A-0112-0085

Descriptors: *Estimates, *Bayes theorem, Measure theory, Stochastic processes, Theorems, Histograms.
Identifiers: *Poisson processes, Moving average.

This paper gives and compares in a numerical example several estimators of the intensity function of a nonstationary Poisson process.

AD-A016 595/1GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Statistics
New Normalizing Approximations for 'Student's' t Distribution.
Technical rept.,
Geoffrey W. Hill. 11 Aug 75, 21p Rept no. TR-223
Contract N00014-67-A-0112-0085

Descriptors: *Statistical tests, *Distribution functions, Approximation, Exponential functions, Degrees of freedom, Computer applications.
Identifiers: T test, Computational complexity.

No abstract available.

AD-A016 596/9GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Statistics
EDF Statistics for Testing for the Gamma Distribution with Application to Testing for Equal Variances.
Technical rept.,
M. A. Stephens. 2 Sep 75, 23p Rept no. TR-224
Contract N00014-67-A-0112-0085

Descriptors: *Sampling, *Distribution functions, *Statistical tests, Estimates, Analysis of variance, Random variables, Monte Carlo method.
Identifiers: *Gamma function, Goodness of fit tests.

Asymptotic percentage points are given for statistics (W sup 2), (U sup 2) and (A sup 2), calculated from the empirical distribution function (EDF) of random variables (z sub i). The (z sub i) are obtained from random variables (x sub i) by (z sub i) = theta *(x sub i) where theta* is an appropriate estimator of an unknown theta. The EDF statistics are used to test that theta(x) is Gamma distributed. An application is given to testing for homogeneity of variances.

AD-A016 597/7GA PC$3.75/MF$2.25
Stanford Univ Calif Dept of Statistics
Deriving Unbiased Risk Estimators of Multinormal Matrix Mean Estimators Using Zonal Polynomials.
Technical rept.,
James V. Zidek. 9 Sep 75, 35p Rept no. TR-225
Contract N00014-67-A-0112-0085

Descriptors: *Multivariate analysis, *Estimates, *Risk, Matrices(Mathematics), Random variables, Chi square test.

Unbiased risk estimators are derived for estimators in certain classes of equivariant estimators of multinormal matrix means, xi. In the case when the covariance structure is known these estimators are based on the sufficient statistic, X, a p x k matrix whose elements are normally distributed and for which E(X) = xi. In cases where the covariance is unknown, it is assumed that there is available independently observed data from which the covariance may be estimated. The method is a multivariate version of that introduced by James and Stein (1960) in establishing the worth of their estimator. The multivariate version uses known zonal polynomial expansions for the distributions of noncentral statistics to achieve the required generalization of the Pitman-Robbins (1949) representation of a noncentral chi-squared statistic.

AD-A016 608/2GA PC$3.25/MF$2.25
Cornell Univ Ithaca N Y Dept of Operations Research
On the Existence of Simultaneous Edge Disjoint Realizations of Degree Sequences with 'Few' Edges.
Technical rept.,
D. J. Kleitman, M. Koren, and S.-Y. Li. Aug 75, 17p Rept no. TR-269
Contract N00014-67-A-0077-0014
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge Contract N00014-67-A-0204-0063 and Pennsylvania Univ., Philadelphia.

Descriptors: *Graphics, Inequalities, Theorems.
Identifiers: *Graph Theory.

This paper contains the following results. For a sequence A, let (M sub A) be the number of non-zero entries in it; suppose A, B and C = (A+B) are sequences that are the degrees of simple graphs; then if summation of (c sub i) or < or = 2(M sub A) + (M sub B) - 2, there exists a realization of C having disjoint factors with degree sequences A and B. At least one of these can be a forest. If A and B are forest realizable, the conditions under which A, B and C can be simultaneously realized with A- and B-factors that are forests are characterized.

AD-A016 635/5GA PC$3.25/MF$2.25
California Univ Berkeley
A Recurrence among the Elements of Functions of Triangular Matrices.
Final rept.,
B. N. Parlett. May 75, 8p Rept no. X-667
Contract N00014-69-A-0200-1017

Descriptors: *Matrices(Mathematics), *Analytic functions, *Algorithms, Simultaneous equations.
Identifiers: *Triangular matrices, *Functions of a matrice.

A simple relation exists among the elements of Phi(T) when Phi is an analytic function and T is triangular. This permits the rapid build up of Phi(T) from its diagonal. Moreover exp(B(-1)A) can be formed without inverting B.

AD-A016 636/3GA PC$5.75/MF$2.25
Cornell Univ Ithaca N Y Dept of Operations Research
Dynamic Programming with Negative Rewards and Average Reward Criterion.
Technical rept.,
Prakash Awate. May 75, 144p Rept no. TR-251
Contracts DAHC04-73-C-0008, N00014-67-A-0077-0020

Descriptors: *Dynamic programming, *Decision theory, Queueing theory, Control theory, Convergence, Problem solving, Markov processes.
Identifiers: Rewards.

Basic results on dynamic programming with finite state and action spaces are generalized to a class of dynamic programming problems that includes most queuing control problems treated in literature. The results establish existence of average reward optimal stationary policies and uniqueness of solution to the functional equation of dynamic programming in the average reward case among nonpositive functions up to an additive constant. The question of convergence of discount optimal policies to average optimal policies is settled in a fairly general setting. Existence of nearly optimal policies is shown in a particular queuing control problem. The principle which turns out to be most useful in the study is a basic probabilistic systems theorem to the effect that a fair game remains fair under transformation by certain systems of optional stopping. (Author)

AD-A016 661/1GA PC$3.75/MF$2.25
Rockwell International Corp Canoga Park Calif Rocketdyne Div
Unbalanced Random-Effect Model with Unequal Group Variances: Maximum Likelihood Estimation of Prior Parameters and Test Design.
Technical rept.,
Kenneth W. Fertig, and Nancy R. Mann. 1 Oct 74, 28p Rept no. RR74-03
Contract N00014-73-C-0474

Descriptors: *Statistical analysis, Distribution functions, Random variables, Estimates, Analysis of variance, Experimental design.
Identifiers: Maximum likelihood estimation, Parameter estimation.

No abstract available.

AD-A016 669/4GA PC-GPO/MF$2.25-NTIS
Naval Research Lab Washington D C
Tables of Angular Spheroidal Wave Functions. Volume 1. Prolate, m = 0,
Arnie Lee Van Buren, Benson J. King, Roland V. Baier, and Sam Hanish. 30 Jun 75, 435p
Library of Congress Catalog Card no. 75-15170.
See also Volume 2, Ad-A016 670.
Availability: Paper copy available from GPO.

Descriptors: *Wave functions, *Wave equations, Computations, Special functions(Mathematical), Tables(Data).
Identifiers: *Angular spheroidal wave functions, *Prolate spheroidal wave functions, *Mathematical tables.

Contents: Prolate spheroidal coordinates; Factored solutions of the Helmholtz wave; Equation in prolate spheroidal coordinates; Prolate angular functions; Brief introduction to the linear prolate functions; Computational procedure; Accuracy of the tables; Use of the tables--(Expansion of g, evaluation of the coefficients (d sub n), calculation of the integrals (I sub l)); Historical review; References and bibliography; Symbols used in the tables; Range of variables.

AD-A016 670/2GA PC-GPO/MF$2.25-NTIS
Naval Research Lab Washington D C
Tables of Angular Spheroidal Wave Functions. Volume 2. Oblate, m = 0,
Arnie Lee Van Buren, Benson J. King, Roland V. Baier, and Sam Hanish. 30 Jun 75, 428p
Library of Congress Catalog Card no. 75-15171.
See also Volume 1, Ad-A016 669.
Availability: Paper copy available from GPO.

Descriptors: *Wave functions, *Wave equations, Computations, Special functions(Mathematical), Tables(Data).
Identifiers: *Mathematical tables, *Oblate spheroidal wave functions, *Angular spheroidal wave functions.

Contents: Oblate spheroidal coordinates; Factored solutions of the Helmholtz wave equation in oblate spheroidal coordinates; Oblate angular functions; Computational procedure; Accuracy of the tables; Use of the tables--expansion of g, evaluation of the coefficients (d sub n), calculation of the integrals (I sub l); Historical review; References and bibliography; Symbols used in the tables; Range of variables.

AD-A016 676/9GA PC$3.25/MF$2.25
Wisconsin Univ Madison Dept of Computer Sciences
Collocation for Systems of Ordinary Differential Equations.
Technical rept.,
John H. Gerutti.. Dec 74, 20p Rept no. TR-230
Contract N00014-67-A-0128-0004

Descriptors: *Differential equations, *Approximation, Numerical analysis, Theorems, Nonlinear differential equations.
Identifiers: *Ordinary differential equations, *Collocation method.

C. de Boor and B. Swartz have shown that by using C sup (M-1) piecewise polynomials of order k + m the C sup (M+2k) solution of an m-th order non-linear differential equation can be approximated to within O(absolute value/delta/sup(k+)) globally and O (absolute value/delta/sup 2k) at the knots by collocation at Gaussian points. An extension of their results to systems of nonlinear equations is given.

AD-A016 683/5GA PC$3.75/MF$2.25
Yale Univ New Haven Conn Dept of Computer Science
Comparative Analysis of the Cuthill-McKee and the Reverse Cuthill-McKee Ordering Algorithms for Sparse Matrices.
Research rept.,
Wai-Hung Liu, and Andrew H. Sherman. 1973, 35p Rept no. RR-28
Contract N00014-67-A-0097-0016

Descriptors: *Matrices(Mathematics), Permutations, Finite element analysis, Algorithms, Theorems.
Identifiers: *Cuthill-McKee algorithm, *Sparse matrix.

In this paper the authors examine the popular Cuthill-McKee algorithm for ordering the unknowns and equations in sparse, positive definite linear systems of equations. For a given linear system Ax = b, this algorithm is designed to produce a permutation matrix P such that PA((P sup T)) has a small bandwidth. The authors wish to exploit zeros in the band of A which occur before the first nonzero in each row and column, it has been experimentally observed that reversing the ordering produced by the Cuthill-McKee algorithm is often very much better than the original ordering in terms of the amount of storage and work required to factor A. It is proven that for band elimination methods, the two orderings are equivalent and that, surprisingly, the reverse ordering is always at least as good as the original one when envelope elimination techniques are used. The authors give a condition on the matrix A under which the reverse ordering is strictly better than the original one, and the authors include several numerical experiments and analyses of practical examples to illustrate our results.

AD-A016 685/0GA PC$3.75/MF$2.25
Wisconsin Univ Madison Dept of Computer Sciences
Collocation Methods for Parabolic Partial Differential Equations in One Space Dimension.
Technical rept.,
John H. Cerutti, and Seymour V. Parter. Apr 75, 30p Rept no. TR-247
Contract N00014-67-A-0128-0004

Descriptors: *Partial differential equations, *Approximation, Laplace transformation, Boundary value problems, Theorems.
Identifiers: *Collocation method, *Parabolic differential equations.

Collocation at Gaussian points for a scalar m'th order ordinary differential equation has been studied by C. de Boor and B. Swartz. J. Douglas, Jr. and T. Dupont, using collocation at Gaussian points, and a combination of energy estimates and approximation theory have given a comprehensive theory for parabolic problems in a single space variable. While the results of this report parallel those of Douglas and Dupont, the approach is basically different. The Laplace transform is used to 'lift' the results of de Boor and Swartz to linear parabolic problems. This indicates a general procedure that may be used to 'lift' schemes for elliptic problems to schemes for parabolic problems. Additionally there is a section on longtime integration and A-stability.

AD-A016 729/6GA PC$4.25/MF$2.25
Technology Inc Dayton Ohio
Approximations to the Distributions of the Likelihood Ratio Statistics for Testing the Hypotheses on Covariance Matrices and Mean Vectors Simultaneously,
T. C. Chang, P. R. Krishnaiah, and J. C. Lee. Jun 75, 53p ARL-75-0176
Contract F33615-73-C-4155

Descriptors: *Multivariate analysis, *Normal density functions, Statistical tests, Approximation, Tables(Data), Matrices(Mathematics), Covariance.
Identifiers: Likelihood ratio tests, Pearson type density functions, Covariance matrices.

In this report, the authors approximated the distributions of certain powers of the likelihood ratio statistics for testing the hypothesis of the homogeneity of populations and the hypothesis that the covariance matrix and mean vector are equal to specified values when the underlying populations are real or complex multivariate normal. The accuracy of these approximations is sufficient for practical purposes.

AD-A016 738/7GA PC$3.25/MF$2.25
California Univ Berkeley Dept of Statistics
One-Step Huber Estimates in the Linear Model,
P. J. Bickel. Sep 71, 8p
Contract N00014-67-A-0114-0004
Availability: Pub. in Jnl. of the American Statistical Association, v70 n350 p428-434 Jun 75.

Descriptors: *Estimates, *Mathematical models, Efficiency, Monte Carlo method, Linear systems, Asymptotic series, Sampling, Reprints.
Identifiers: Huber estimates, M estimates, Maximum likelihood estimates, Linear models.

Simple one-step versions of Huber's (M) estimates for the linear model are introduced. Some relevant Monte Carlo results obtained in the Princeton project are singled out and discussed. The large sample behavior of these procedures is examined under very mild regularity conditions. (Author)

AD-A016 752/8GA PC$3.25/MF$2.25
Princeton Univ N J Dept of Statistics
Mathematical Morphology,
Geoffrey S. Watson. 1975, 7p
Contract N00014-67-A-0151-0017
Availability: Pub. in A Survey of Statistical Design and Linear Models, p547-553.

Descriptors: *Set theory, Transformations(Mathematics), Estimates, Mathematical models, Light, Morphology, Mathematics, Pictures, Reprints.

No abstract available.

AD-A016 804/7GA PC$3.25/MF$2.25
California Univ Berkeley Operations Research Center
On the Solutions of the Positive Semi-Definite Complementarity Problem.
Research rept.,
Ilan Adler, and David Gale. Aug 75, 16p Rept no. ORC-75-12
Contract N00014-69-A-0200-1010, Grant NSF-MPS74-21222

Descriptors: *Quadratic programming, *Linear programming, *Convex sets, *Polygons, Matrices(Mathematics), Vector analysis.
Identifiers: Quality theory, *Polyhedrons, Complimentary solutions.

A short direct proof is given of the fact that if a semi-definite complementarity problem is feasible then it is solvable. It is also shown that the set of all complementary solutions of such a problem is a face of the polyhedron of all feasible solutions and an effective procedure for finding all such solutions is given. (Author)

AD-A016 825/2GA PC$4.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
Distance Matrices of Trees.
Technical rept.,
R. L. Graham, and L. Lovasz. Sep 75, 51p Rept no. STAN-CS-75-497
Contract N00014-67-A-0112-0057, Grant NSF-DOR72-03752
Prepared in cooperation with Bell Labs., Murray Hill, N.J., and Eotvos Lorand Univ., Budapest (Hungary).

Descriptors: *Graphics, *Matrices(Mathematics), Permutations, Theorems.
Identifiers: *Graph theory, Trees(Mathematics).

No abstract available.

AD-A016 829/4GA PC$3.75/MF$2.25
University of Southern California Los Angeles Social Science Research Inst
Misaggregation Explains Conservative Inference About Normally Distributed Populations.
Technical rept.,
Gloria E. Wheeler, and Ward Edwards. 1 Aug 75, 42p Rept nos. USC-001597-5-T, SSRI-RR-75-11
Contract N00014-75-C-0487, ARPA Order-2105

Descriptors: *Probability, Bayes theorem, Sampling, Normal density functions, Random variables, Hypotheses.
Identifiers: *Statistical inference.

Three major hypotheses have been proposed to account for conservative inference: misaggregation, misperception, and response bias. The research reported in this paper allowed the testing of these hypotheses. Subjects made probabilistic judgments about stimuli generated from normally distributed populations.

AD-A016 852/6GA PC$3.75/MF$2.25
Texas Tech Univ Lubbock Dept of Electrical Engineering
On the Essential Quadratic Nature of LQG Control-Performance Measure Cumulants.
Interim rept.,
S. R. Liberty, and R. C. Hartwig. Aug 75, 39p
Contracts N00014-73-A-0434-0002, N00014-75-C-0779

Descriptors: *Control theory, Statistical analysis, Performance, Linear systems, Feedback, Mathematical models.
Identifiers: Linear quadratic gaussian control.

An in depth look at a complete statistical description of linear-quadratic-Gaussian (LQG) performance measures is presented in this paper. The development leads to computationally tractable formulae that form the basis for design performance analysis. The complete statistical description of performance developed here exhibits the essential quadratic nature of the LQG class of systems.

AD-A016 877/3GA PC$3.75/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Ground Equipment/Materials Directorate
Analysis of Shells of Revolution by a Curved Finite Element.
Technical rept.,
Ju-Chin Huang, and Charles M. Eldridge. 30 May 75, 46p Rept no. RL-75-10

Descriptors: *Bodies of revolution, *Finite element analysis, *Shells(Structural forms), Boundary value problems, Elastic properties, Stresses, Potential energy, Computer programs, Differential equations, Transverse, Shear properties, Symmetry, Loads(Forces), Equilibrium(General).
Identifiers: *Shells of revolution, Ritz method.

This report involves the development of a curved finite element for the analysis of symmetrically loaded shells of revolution with transverse shear effects. The shell displacements are written in local rectilinear coordinates. They are represented by four-degrees of freedom at a node, two translations and two rotations. The geometric approximation of the curved shell element is similar to that given by Khojasteh-Bakht in 'Analysis of Elastic-Plastic Shells of Revolution Under Axisymmetric Loading by the Finite Element Method.' The equilibrium equations governing the shell behavior were derived by the principle of minimum total potential energy. Several selected numerical examples were solved and the solutions are in excellent agreement with known results. (Author)

AD-A016 902/9GA PC$3.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
Sample Size Determination for a Random Variable of Bounded Variation,
J. Richard Moore. Sep 75, 12p Rept no. BRL-1833

Descriptors: *Sampling, *Random variables, Analysis of variance, Distribution functions, Theorems.
Identifiers: Central limit theorem.

A procedure for determining the sample size required to estimate the mean of a random variable of bounded variation is given and its use is illustrated via two examples, one a computer simulation problem and the other a field experiment.

AD-A016 907/8GA PC$3.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
On the Power of the Extreme Spread.
Memorandum rept.,
Malcolm S. Taylor. Sep 75, 16p Rept no. BRL-MR-2534

Descriptors: *Sampling, *Normal density functions, Statistical tests, Monte Carlo method, Standard deviation.
Identifiers: Chi square test, Random sampling, Extreme spread.

A variety of techniques are available for testing whether a random sample might reasonably be assumed to have come from a normal population. If, however, the random sample is a bivariate random sample the number of choices is greatly reduced. The purpose of this note is to suggest a new statistic for testing the hypothesis of bivariate normality in the case of known sigma which is easily computed and whose power seems to be far superior to the classical chi-square test, and in addition, may be used with small sample sizes, where the chi-square test is inappropriate.

AD-A016 991/2GA PC$3.25/MF$2.25
Army Missile Command Redstone Arsenal Ala Systems Analysis Office
Evaluation of the Triangular Distribution Integral,
Charles E. Colvin. Sep 75, 15p Rept no. C-TN-75-4

Descriptors: *Risk, *Probability density functions, Random variables, Integrals, Uncertainty.

The report presents the results of an effort to evaluate, in a closed-form, the triangular probability density function integral. Closed-form integrals are developed for (1) discrete interval probabilities and (2) cumulative probabilities. All of these probabilities are easily determined once the appropriate parameters of the triangular probability density function are known.

COM-75-50613/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
D-Stability and Real and Complex Quadratic Forms.
Final rept.,
Charles R. Johnson. 1974, 6p
Pub. in Linear Algebra and Appl., v9 p89-94 1974.

Descriptors: *Matrices(Mathematics), Quadratic forms.
Identifiers: Reprints.

The problem of characterizing the class of D-stable matrices has remained unsolved since its suggestion in a paper by Arrow and McManus in 1958. In this note the author presents a necessary condition involving real quadratic forms which is not sufficient and a sufficient condition involving complex quadratic forms which is not necessary.

COM-75-50633/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Hadamard Product of A and A*.
Final rept.,
Charles R. Johnson. 1974, 5p

Pub. in Pacific Jnl. of Mathematics, v51 n2 p477-481 1974.

Descriptors: *Matrices(Mathematics), Computation.
Identifiers: *Hadamard matrix, Reprints.

Coefficient-wise multiplication was introduced by Hadamard and has been studied for certain square matrices by I. Schur and later authors. For A a member of (M sub n) (C), the n by n complex matrices, this paper examines the Hadamard product of A and A*. Upper estimates are given for the largest characteristic root of this necessarily Hermitian product, and three conditions on A sufficient for the product to be positive definite are presented.

COM-75-50652/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Some Results on Unitary Matrix Groups.
Final rept.,
Marvin Marcus, and Morris Newman. 1970, 6p
Pub. in Linear Algebra and Appl., n3 p173-178 1970.

Descriptors: *Matrices(Mathematics), Computation.
Identifiers: Reprints.

It is shown that an irreducible matrix group with uniformly bounded trace is itself uniformly bounded, and so equivalent to a unitary group. This result is used to prove that certain matrix groups preserving certain scalar valued functions are unitary.

COM-75-50653/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Bounded Matrix Groups.
Final rept.,
M. Newman, and S. Pierce. 1973, 6p
Pub. in Linear and Multilinear Algebra, v1 n3 p251-256 1973.

Descriptors: *Matrices(Mathematics), Group theory.
Identifiers: Reprints.

The principal result is that if G is any irreducible subgroup of GL(n, C) (C the complex field) such that the absolute value of (tr(TA)) is uniformly bounded for all A in G and some fixed n x n nonzero matrix T, then G is equivalent to a unitary group. Similar results are proved for certain associated representations of G.

NTIS/PS-75/794/8GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Integration of Nonlinear Differential Equations (A Bibliography with Abstracts).
Rept. for 1970-Nov 75,
David W. Grooms. Oct 75, 86p*
Supersedes NTIS/PS-75/028.

Descriptors: *Bibliographies, *Nonlinear differential equations, *Numerical integration, Applications of mathematics, Computation, Computer programming, Runge-Kutta method, Laplace transformation, Boundary value problems, Finite difference theory.
Identifiers: Variation methods, Computer application, Two point boundary value problems.

Research is cited on the numerical integration of nonlinear differential equations. Other methods of solution included are variational methods, finite difference methods, Laplace transform techniques, Runge-Kutta methods, and conjugate gradient methods. Solutions to two point boundary value problems and multipoint boundary value problems are also presented.

N75-31820/4GA PC$4.25/MF$2.25
Polytechnic Inst. of New York, Farmingdale. Dept. of Aerospace Engineering and Applied Mechanics.
High-Order Numerical Solutions Using Cubic Splines.
Final Report, 1 Sep. 1974 - 31 Aug. 1975.
S. G. Rubin, and P. K. Khosla. Aug 75, 62p
NASA-CR-143440
Grant NSG-1091

Descriptors: *Numerical analysis, *Partial differential equations, *Spline functions, Boundary layer flow, Burger equation, Potential flow.

For abstract, see STAR 1322

N75-31845/1GA PC$6.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Electronic Systems Lab.
Estimation and Analysis of Nonlinear Stochastic Systems.
Ph.D. Thesis.
S. I. Marcus. Jun 75, 159p NASA-CR-143455, ESL-R-601
Contracts NGL-22-009-124, AF-AFOSR-72-2273

Descriptors: *Nonlinear systems, *Stochastic processes, Lie groups, Volterra equations.

For abstract, see STAR 1322

12B. Operations Research

AD-A016 350/1GA PC$3.75/MF$2.25
Wisconsin Univ Madison Mathematics Research Center
A Characterization of Stability in Linear Programming.
Summary rept.,
Stephen M. Robinson. Jun 75, 26p Rept no. MRC-TSR-1542
Contract DA-31-124-ARO(D)-462, Grant NSF-DCR74-20584

Descriptors: *Linear programming, Convex sets, Inequalities, Perturbations, Theorems.
Identifiers: Duality theory.

The author proves that a necessary and sufficient condition for the primal and dual solution sets of a solvable, finite-dimensional linear programming problem to be stable under small but arbitrary perturbations in the data of the problem is that both of these sets be bounded. The distance from any pair of solutions of the perturbed problem to the solution sets of the original problem is then bounded by a constant multiple of the norm of the perturbations. These results extend earlier work of Williams.

AD-A016 601/7GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Statistics
Optimal System Allocations with Penalty Costs.
Technical rept.,
C. Derman, G. J. Lieberman, and S. M. Ross. 29 Aug 75, 17p Rept no. TR-171
Contract N00014-75-C-0561

Descriptors: *Allocations, *Optimization, Costs, Mathematical models, Theses, Theorems.
Identifiers: *Allocation models, Penalty functions.

Assume that one has N stages to sequentially construct I successful components. At each stage one allocates a certain amount of money for the construction of a component. If y is the amount allocated then the component constructed will be a success with probability P(y), where P is a continuous nondecreasing function satisfying P(O) = O. After each component is constructed one is informed as to whether or not it is successful. If, at the end of the N stages, there are i components short, then a final penalty cost C(i) is incurred. The problem is to, at each stage, determine how much money to allocate so as to minimize the total expected cost (construction cost plus penalty cost) incurred. This model is similar to that presented in another paper except for the cost function.

AD-A016 620/7GA PC$3.25/MF$2.25
California Univ Berkeley Operations Research Center
Eligible Cuts in Simple Polytopes.
Research rept.,
Ilan Adler, and Aydin Ulkucu. Jun 75, 22p Rept no. ORC-75-10
Contract N00014-69-A-0200-1010, Grant NSF-MPS-74-21222

Descriptors: *Operations research, *Mathematical programming, *Convex sets, *Polygons, Operators(Mathematics), Inequalities, Algorithms.
Identifiers: *Polytopes, *Hyperplanes, *Polyhedral sets.

No abstract available.

AD-A016 621/5GA PC$3.75/MF$2.25
California Univ Berkeley Operations Research Center
Structure, Evaluation, and Control of Decision Activity Networks.
Research rept.,
Klaus Neumann. Jul 75, 48p Rept no. ORC-75-11
Contract N00014-69-A-0200-1010

Descriptors: *Decision theory, *Networks, *Computer logic, *Control theory, Probability, Stochastic processes, Assessment, Functional analysis, Density, Cost analysis, Determinants(Mathematics), Random variables, Optimization, Operations Research, Simulation.
Identifiers: Decision activity networks, Node logic, Gerts, Admissible structure, Basic elements, State variables.

A new approach for handling special decision networks is presented. This approach also allows for optimally controlling the corresponding projects. Decision networks are activity networks with several kinds of nodes, and with each arc is associated the probability that the corresponding activity is performed, and the duration of the activity, a nonnegative random variable. Three possible entrance sides (and, exclusive-or, inclusive-or) and two exit sides (deterministic, stochastic) of a node and hence six different node types are considered satisfying a so-called 'node logic'.

AD-A016 637/1GA PC$5.75/MF$2.25
Cornell Univ Ithaca N Y Dept of Operations Research
A Sequential Goodness-of-Fit Test for Composite Hypotheses Involving Unknown Scale and Location Parameters.
Technical rept.,
Richard David Gelber. Aug 75, 143p Rept no. TR-266
Contracts DAHC04-73-C-0008, N00014-67-A-0077-0020

Descriptors: *Distribution functions, *Parametric analysis, *Statistical tests, *Operations research, *Sequential analysis, Analysis of variance, Stochastic processes, Random variables, Sequences(Mathematics), Hypotheses, Probability, Set theory, Computer applications, Simulation.
Identifiers: Goodness of fit tests.

No abstract available.

AD-A016 647/0GA PC$4.75/MF$2.25
Cornell Univ Ithaca N Y Center for Applied Mathematics

Some Results on Values of Finite and Infinite Games.
Technical rept.,
Pradeep K. Dubey. Aug 75, 90p
Contract N00014-67-A-0077-0014, Grant NSF-GP-32314

Descriptors: *Game theory, Mathematical models, Convex sets, Probability, Theorems, Theses.
Identifiers: Cooperative games, N person games, Axioms.

The report is concerned with values of finite and infinite games given in characteristic function form.

AD-A016 654/6GA PC$3.25/MF$2.25
Cornell Univ Ithaca N Y Dept of Operations Research
On Mathematics in Energy Research.
Technical rept.,
William F. Lucas. Sep 75, 16p Rept no. TR-273
Contract N00014-67-A-0077-0014, Grant NSF-MPS75-02024

Descriptors: *Mathematical models, *Research management, Energy management, Meetings.

This report contains comments on the papers presented at the SIMS Research Applications Conference on Energy at Alta, Utah on July 7-11, 1975, plus remarks on some types of mathematical models and new methodologies which may prove useful in such research.

AD-A016 828/6GA PC$3.25/MF$2.25
University of Southern California Los Angeles Social Science Research Inst
Eliciting Subjective Probability Distributions on Continuous Variables.
Research rept.,
David A. Seaver, Detlof v. Winterfeldt, and Ward Edwards. 1 Aug 75, 23p Rept nos. USC-001597-3-T, SSRI-RR-75-8
Contract N00014-75-C-0487, ARPA Order-2105

Descriptors: *Forecasting, *Performance(Human), Estimates, Probability, Statistical distributions, Assessment, Variables, Uncertainty, Experimental data, Test methods, Students, Questionnaires, Hypotheses.
Identifiers: *Judgment(Psychology), *Subjective probability.

Five procedures for assessing subjective probability distributions over continuous variables were compared using almanac questions as stimuli. The procedures varied on the uncertainty measures used (probabilities, odds, and odds on a logarithmic scale) and the type of response required from the subjects (uncertainty measure or value of the unknown quantity). The results showed the often used fractile procedures were inferior to procedures requiring probabilities or odds as the response from subjects. The results are also discussed in terms of the 'anchoring and adjustment' hypothesis.

AD-A016 836/9GA PC$3.75/MF$2.25
Stanford Univ Calif Dept of Engineering-Economic Systems
The Value of Information Given Decision Flexibility.
Technical rept. 1 May 73-31 May 75,
Miley Wesson Merkhofer. 30 Jun 75, 32p Rept no. ESS-DA-75-2
Contract N00014-67-A-0112-0077, Grant NSF-GK-36491

Descriptors: *Decision making, *Decision theory, Mathematical models, Uncertainty, Value, Economic models, Matrix theory.
Identifiers: Sensitivity analysis, Flexibility.

This paper presents a useful concept for decision analysis -- the value of information having flexibility. An exploration is made into the impact of decision flexibility on the value of information. The usefulness of calculating the value of information under various assumptions concerning decision flexibility is illustrated with a simple economic example. An upper limit to the value of information given flexibility is the expected value of perfect information given perfect flexibility (EVPIGPF). By approximating an arbitrary smooth value function with a quadratic equation, first order characteristics of the EVPIGPF are identified. Finally, it is shown that the technique of proximal decision analysis may be expanded to provide a simplified estimation of the EVPIGPF for large-scale decision problems.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A016 297/4GA PC$3.25/MF$2.25
Kentucky Univ Lexington Dept of Statistics
A Class of Distributions Useful in Life Testing and Reliability.
Technical rept.,
Z. Govindarajulu. Aug 75, 15p Rept nos. TR-90, TR-12-ONR
Contract N00014-75-C-1003

Descriptors: *Refrigeration systems, *Electric motors, *Reliability, *Life tests, Probability density functions, Degrees of freedom, Estimates, Statistical analysis.
Identifiers: Parameter estimation, Order statistics.

A new class of distributions having a finite range that are useful in life testing and reliability is proposed. Methods of estimating the unknown parameters are studied. Explicit expressions for lower moments of order statistics in random samples of any size are derived. A uniformly most powerful test is derived for the 'shape' parameter and it is illustrated by the data on times to failure of refrigerator motors.

COM-75-50585/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Experiments with Miniature Heat Exchangers for Dilution Refrigerators.
Interim rept.,
R. Radebaugh, J. D. Siegwarth, Y. Oda, and H. Nagano. 7 May 74, 3p
Pub. in Proceedings of International Cryogenic Engineering Conference (5th), Kyoto, Paper H3 p235-237, 7 May 74.

Descriptors: *Heat exchangers, Refrigerators, Miniaturization, Cryogenics, Dilution, Copper, Metal powder, Copper alloys, Silver.
Identifiers: Reprints.

The paper describes experiments done on three types of minature heat exchanger for dilution refrigerators. These have liquid volumes on the order of 0.1cm(3). The first is a continuous exchanger incorporating Cu(Cr) powder, the second is a continuous exchanger incorporating sub-micron silver powder, and the third is a discrete exchanger incorporating 1.8 micrometer copper powder. The first two were not successful and the reasons are not entirely clear. The third exchanger performed about as calculated and permits an order of magnitude reduction in liquid volumes from that normally used.

N75-31568/9GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Solar Collector Performance Evaluation with the NASA-Lewis Solar Simulator-Results for an All-Glass-Evacuated-Tubular Selectively-Coated Collector with a Diffuse Reflector.
F. Simon. Apr 75, 30p NASA-TM-X-71695, E-8289

Descriptors: *Energy policy, *Performance tests, *Solar collectors, *Solar simulators, Energy technology, Incidence, Photographs, Solar energy, Test facilities, Thermodynamics.

For abstract, see STAR 1322

N75-31570/5GA PC$4.75/MF$2.25
Old Dominion Univ., Norfolk, Va. School of Engineering.
Investigation of Current University Research Concerning Energy Conversion and Conservation in Small Single-Family Dwellings.
Final Technical Report, 7 Apr. - 7 Aug. 1975.
G. R. Grossman, and A. S. Roberts, Jr.. 7 Aug 75, 87p NASA-CR-143430, TR-75-T11
Grant NSG-1172

Descriptors: *Energy conservation, *Energy conversion, *Residential areas, Air conditioning, Heat pumps, Heat storage, Solar collectors, Solar heating, Thermal insulation.

For abstract, see STAR 1322

PB-245 162/3GA PC$5.75/MF$2.25
Combustion Engineering, Inc., Windsor, Conn.
Program for Reduction of NOx from Tangential Coal-Fired Boilers. Phase II.
Final rept. Jul 73-Mar 75,
Ambrose P. Selker. Jun 75, 144p EPA/650/2-73/005-a
Contract EPA-68-02-1367
See also PB-226 547.

Descriptors: *Boilers, *Nitrogen oxides, *Air pollution control, Coal, Tables(Data), Process charting, Combustion products, Flue gases.
Identifiers: *Overfire air systems.

This report presents the finding of a project. Phase I of the program consisted of selecting the Alabama Power Company, Barry Station no. 2 steam generator which was modified for the studies performed under Phase II. The work accomplished under Phase II included the design, fabrication, and delivery of an overfire air system for the test unit, the installation of test equipment, planning, and the conducting of baseline, biased firing and overfire air studies for NOx emission control while burning a Kentucky bituminous coal type. These test programs included an evaluation of the effect of variations in excess air, unit slagging, load and overfire air on unit performance and emission levels.

PB-245 425/4GA PC$3.75/MF$2.25
Schlesinger (Robert J.), Tarzana, Calif.
Hybrid Simulation of Solar HVAC System for House Retro-Fit Design.
Semi-annual progress rept. 1 Jul-31 Dec 74,
Robert J. Schlesinger. 31 Jan 75, 47p
NSF/RA/N-75/070
Grant NSF-GI-43896

Descriptors: *Solar space heating, *Solar air conditioning, *Simulators, Hybrid simulation, Solar collectors, Heat storage, Control equipment, Design, Computerized simulation, Residential buildings.

This report treats the development of a small analog solar HVAC simulator that can be used as a research tool as well as provide a possible approach to sizing solar systems for retro-fit installations in dwellings. The system concept

and implementation of this concept in terms of the hardware and software developed are discussed.

13B. Civil Engineering

AD-A016 296/6GA PC$5.75/MF$2.25
Little (Arthur D) Inc Cambridge Mass
Chemical Hazards Response Information System for Multimodal Accidents (CHRISMA). (A Reevaluation of CHRIS for All Modes of Transportation).
Final rept.,
Donald S. Allan, and George H. Harris. Apr 75, 133p Rept no. ADL-C-74685-60-F USCG-D-148-75
Contract DOT-CG-24655-A

Descriptors: *Chemicals, *Water pollution, *Information retrieval, Transportation, Hazards, Accidents, Planning, Spilling, Wastes(Industrial), Response, Oil spills, Flammability, Poisons, Toxicity, Organic compounds, Systems engineering, Emergencies, Information systems.
Identifiers: *Hazardous materials spills, *Hazardous materials transportation, *Water pollution abatement, Contingency planning, Transportation safety, DOT/SN, Chemical Hazards Response Information System, DOT/4HZ/HB.

This report examines the need for improved technical and other information for meeting emergencies connected with the transportation of hazardous materials, particularly actual or potential chemical discharges regardless of mode. The Chemical Hazards Response Information System (CHRIS), under development by the United States Coast Guard to furnish in-depth guidance during emergencies involving waterborne transport, was seen as a likely prototype for other modes as well. Accordingly, a reevaluation of CHRIS has been conducted to determine the desirability of enlarging its scope to encompass all modes of transportation. It is concluded that the expanded system would indeed be beneficial in reducing losses to life, property, and the environment. Necessary modifications to CHRIS are conceptually quite modest in nature. The information system would be composed of a decentralized organization providing response guidance on request to local emergency services personnel, a computerized hazard assessment system operated at Headquarters, and three reference manuals furnished to all response organizations.

AD-A016 337/8GA PC$5.25/MF$2.25
Naval Postgraduate School Monterey Calif
Beams on Nonlinear Foundations.
Master's thesis,
Vo Thanh Tam. Sep 75, 107p

Descriptors: *Foundations(Structures), *Beams(Structural), Soil dynamics, Loads(Forces), Shear properties, Finite difference theory, Computer programs, Theses, Nonlinear systems.
Identifiers: *Soil structure interactions, *Elastic foundations.

The solution of a beam on an elastic nonlinear foundation by the Finite Element Method is presented in this thesis. Discontinuous (Winkler) and continuous foundations are considered. The general formulation is based on the Galerkin method. The solution technique for the linear case uses Gauss elimination and the solution technique for the nonlinear case is based on Brown's method (a modified Newton-Raphson). Some illustrative examples are presented. A brief comparison of continuous and noncontinuous foundations is made.

AD-A016 384/0GA PC$3.75/MF$2.25
Naval Academy Annapolis Md Div of Engineering and Weapons
Separation of Oil Bilge Water by Semipermeable Membrane,
Gerald M. Stahl, Daniel H. Meyer, and Bruce H. Rankin. Aug 72, 36p Rept no. EW-72-7

Descriptors: *Oil pollution, *Separators, *Membranes, Performance tests, Bilges.
Identifiers: *Bilge water, *Oil pollution control, *Oil water separators.

Three different membranes were tested to determine their ability to filter oil from bilgewater. Separation was excellent, but oil coated the membranes so that thruput decreased with time. One membrane, when backflushed, returned to its original effectiveness.

AD-A016 422/8GA PC$3.75/MF$2.25
Environmental Health Lab Mcclellan AFB Calif
An Environmental Evaluation of Acid Scrubbers; Building 628, McClellan AFB CA.
Final rept.,
Jerry W. Jackson, and William E. Normington. Aug 75, 37p Rept no. EHL-M-72M-11

Descriptors: *Air pollution, *Scrubbers, Acids, Processing, Hydrochloric acid, Nitric acid, Perchloric acid, Chemical reactions, Cellulose, Exhaust gases, Emission, Vapors, Environments, Performance(Engineering), Efficiency, Test methods.
Identifiers: Local studies, Chemical laboratories.

An environmental evaluation was conducted of an operation in which nitric, perchloric, and hydrochloric acid vapors and aerosols are generated. The evaluation was requested to determine why a visible white plume existed at the exhaust of a wet scrubber. The white plume was formed regardless of meteorological conditions when acid vapors and aerosols were generated. The evaluation included a scrubber efficiency study, an environmental assessment and an air pollution regulation compliance tests. (Author)

AD-A016 442/6GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
Economic Effects of Enforcement Variables on Commercial Oil Pollution Control Strategy.
Master's thesis,
Roger Charles Cook. Sep 75, 91p

Descriptors: *Oil pollution, *Economic analysis, *Law enforcement, Regulations, Cleaning, Decision making, Water pollution, Theses, Coast Guard.
Identifiers: Oil pollution removal, *Oil pollution control, Water law, DOT/5C.

An economic decision model for oil pollution control strategy is developed and applied to data taken from the Coast Guard's Pollution Control Incident Reporting System. The model and analysis show the impact of civil penalties, cleanup costs and internal costs on a firm's pollution control strategy. Civil penalties appear to have the largest effect on controlling minor spills, while internal costs become increasingly important to the firm's decision to control larger spills. Notes are included on the PIRS data base and development of an oil spill incident cost model.

AD-A016 450/9GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Pavement Response to Aircraft Dynamic Loads; Volume I. Instrumentation Systems and Testing Program.
Final rept. May 71-Jan 75,
Walter J. Horn, and Richard H. Ledbetter. Jun 75, 82p FAA-RD-74-39-1
Contract DOT-FA71WAI-218

Descriptors: *Landing fields, *Pavements, Aircraft landings, Dynamic loads, Static loads, Runways, Dynamic response.
Identifiers: *Rigid pavements, DOT/4CZ/CA, Flexible pavements.

This report describes a study designed to determine the relationship between airport runway pavement responses to static and dynamic aircraft loads. Two series of tests were conducted, one during cold weather and the other during warm weather, at the National Aviation Facilities Experimental Center Airport, Atlantic City, N.J. Both a flexible and a rigid pavement runway were instrumented to measure and record pavement responses to aircraft loads. Aircraft were instrumented for both series to measure the aircraft wheel loads transmitted to the pavement structures during normal aircraft operations. A common time code signal recorded along with the pavement response and aircraft load data provided the means for correlating the two types of data. Data were collected for the following basic aircraft modes of operation: static loading; creep-, low-, medium-, and high-speed taxi; high-speed braking; take-off rotation; touchdown; high-speed braking with reverse thrust; and turning.

AD-A016 461/6GA PC$3.75/MF$2.25
Spectrogram Corp North Haven Conn
Petroleum Oil Detection Buoy System.
Final rept.,
Herbert R. Gram. 31 Mar 75, 37p Rept no. 0250 USCG-D-39-75
Contract DOT-CG-43345

Descriptors: *Oil pollution, *Detectors, *Buoys, Fluorescence, Ultraviolet radiation, Performance tests, Chemical analysis.
Identifiers: *Water pollution detection, DOT/5C, DOT/5N, Spectroscopic analysis.

Extended capability floating buoy designed to detect petroleum oils ranging in composition from crude to kerosene has been developed and performance tested. This buoy is powered by a land based low voltage direct current power supply at nominally 12 volts. The average total power requirements for the buoy are less than 0.75 watts. The detection system employs fluorescent techniques whereby the oils floating on the water surface are excited by short wavelength ultraviolet radiation and produce, by fluorescence emission, radiation in the near ultraviolet and blue end of the visible spectrum. The fluorescent radiation is selectively detected to produce an alarm condition. Improvements have been made to the mechanical packaging to facilitate deployment and field service.

AD-A016 465/7GA PC$4.75/MF$2.25
Arctec Inc Columbia Md
Tests of Oil Recovery Devices in Broken Ice Fields. Phase I.
Final rept.,
L. A. Schultz, P. C. Deslauriers, R. P. Voelker, O. M. Halstad, and D. E. Abrams. Jul 75, 91p Rept no. 228-C USCG-D-130-75
Contract DOT-CG-51487-A

Descriptors: *Oil pollution, *Ice, *Arctic regions, Separators, Oil spills, Recovery, Water pollution, Diesel fuels, Fuel oil, Cold weather tests.
Identifiers: Water pollution control, *Oil pollution removal, Crude oil, DOT/5C.

This is the final report of full size tests of two oil spill recovery devices, the Lockheed Clean Sweep Model R2003 and the Marco Pollution Control Class I Oil Recovery System, operating in a simulated Arctic environment incorporating below freezing temperatures and ice infested waters. Tests were conducted with both devices in broken fresh water ice and salt water ice, with No. 2 diesel oil and a crude oil selected to closely match the properties of Prudhoe Bay crude oil, at temperatures of +25F and +15F.

These tests demonstrated that with minor hardware modifications and the proper operating procedures, both devices will successfully recover crude oil and No. 2 diesel oil spilled in a broken ice field of moderate icepiece size.

AD-A016 466/5GA PC$5.25/MF$2.25
Mcdonnell Douglas Astronautics Co Huntington Beach Calif
Los Angeles Harbor Field Investigation of Oil and Background Luminescence Signatures.
Final rept.,
H. Gerald Gross. May 75, 121p USCG-D-154-75
Contract DOT-CG-51998-A

Descriptors: *Oil spills, *Oil pollution, *Ultraviolet detectors, Ultraviolet lasers, Luminescence, Gas chromatography, Mass spectrometry, Oils, Hydrocarbons, Greases, Fluorescence, Reflectance, California.
Identifiers: *Water pollution detection, *Oil pollution detection, *Remote sensing, *Los Angeles Harbor, DOT/5C.

A field investigation of UV laser (pulsed and CW) induced luminescence signatures of site water at five scattered sites in Los Angeles Harbor and one in its principal source of inland inflow, Dominguez Channel, was achieved. The signatures are similar, indicating dominance by one or more common constituents. The peak at about 4500A and shape of the signature suggest dominance by heavier aromatics, probably by oil and grease, among the principal pollutants. Gas chromatograph-mass spectrometer analyses of site samples show light and heavy constituents, some of which are aromatics. Further work is necessary to relate luminescence signatures to composition. Luminescence signatures of light, medium and heavy oils were established as measurable against the strong water luminescence background. Reflectance signatures of oil films on water indicate a luminescent component due to sky scattered daylight and direct sun UV irradiation. Multispectral photography provided a few examples of site supportive information.

AD-A016 791/6GA PC$4.75/MF$2.25
Army Engineer Div North Pacific Bonneville Oreg Div Hydraulic Lab
Filling and Emptying System. Little Goose Lock. Snake River, Washington, Hydraulic Model Investigation.
Final rept.,
Louis Z. Perkins, and Alvin J. Chanda. Sep 75, 98p Rept no. TR-115-1

Descriptors: *Dams, *Canals, *Hydraulic models, Waterways, Filling, Barges, Loads(Forces), Washington(State).
Identifiers: Little Goose Lock, Snake River, Locks(Waterways), Check structures, Fishways.

Little Goose Lock, located on the Snake River 70.3 miles above its junction with the Columbia River at Pasco, Washington, is 86 ft wide by 675 ft long and is designed for a maximum lift of 101 ft. The split-lateral hydraulic system, with floor culverts on 50-ft centers, is unique because both intake manifolds and both longitudinal culverts are in the right wall. This design was expected to reduce construction costs about $240,000. Portions of the forebay and tailrace and all elements of the lock chamber and hydraulic system were reproduced in a 1:25-scale model. The proposed arrangements of lateral culverts (five floor laterals supplied by each longitudinal culvert) was not satisfactory. Average and individual maximum longitudinal forces with an 8-barge tow were less than the allowable force of 5 tons; however transverse forces were excessive (7.5 tons at upstream end and 8.1 tons at downstream end).

AD-A016 854/2GA PC$4.25/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Evaluation of a Nuclear Asphalt Content Gage.
Final rept.,
George L. Regan. Oct 75, 54p Rept no. AEWES-Misc-Paper-S-75-23

Descriptors: *Pavements, *Asphalt, *Radiation measuring instruments, Sampling, Moisture.
Identifiers: *Nuclear asphalt gages.

The developments of nuclear asphalt content gages were reviewed and gage operation and use were studied in the laboratory to determine significant parameters that may affect nuclear gage results. Two Troxler Model 2226 Asphalt Content Gages, serial Nos. 307 and 308, were used in this study. Parameters investigated were (a) asphalt content; (b) moisture content; (c) aggregate gradation; (d) interactions of (a), (b), and (c); (e) sample size; and (f) sample temperature. Precision and accuracy experiments were conducted. These included (2 sup n) factorial experiments and stepwise multiple linear regression analyses of the results. Asphalt content determinations equaling or bettering those of the conventional extraction technique were obtained in considerably less time.

AD-A016 904/5GA PC$7.00/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Los Angeles and Long Beach Harbors Model Study: Report 5. Tidal Verification and Base Circulation Tests.
Technical rept.,
William H. McAnally, Jr. Sep 75, 196p Rept no. AEWES-TR-H-75-4-5
See also report dated Jan 75, AD/A-005 149.

Descriptors: *Harbors, *Tidal currents, *Hydraulic models, Water waves, Oscillation, Tides, Diurnal variations, California.
Identifiers: Long Beach harbor, Los Angeles harbor.

The objectives of the Los Angeles and Long Beach Harbors model studies are to investigate tidal circulation and basin oscillation characteristics of the existing harbors and to evaluate the impact of proposed harbor modifications upon these phenomena. To conduct these studies, a physical hydraulic model has been constructed with linear scales of 1:100 vertically and 1:400 horizontally, which reproduces astronomical tides and tidal currents and is capable of reproducing wastewater discharges. The model has been verified to correctly reproduce tidal elevations, phases, current velocities, and net flows observed in the prototype. Base tests of typical spring tide (7.1-ft diurnal range) and neap tide (3.5-ft diurnal range) conditions have been conducted to establish existing tidal circulation characteristics of the harbors.

AD-A017 000/1GA PC$7.50/MF$2.25
Lockheed Missiles and Space Co Inc Sunnyvale Calif
Prototype High-Seas Disc-Drum Oil Recovery System.
Final rept. May 72-Oct 74,
C. F. Scharfenstein, and W. T. Beran. Jun 75, 247p USCG-D-150-75
Contracts DOT-CG-24231-A, DOT-CG-32782-A

Descriptors: *Oil pollution, *Separators, Recovery, Water pollution, Performance tests, Transportation, Oceans, Offshore, Oil spills, Pumps, Ships, Coast Guard.
Identifiers: DOT/5C, DOT/4IZ/IY, *Oil pollution removal, *Oil water separators, Skimmers, Water pollution control.

The delivered oil recovery unit was designed to recover up to 1,000 gpm of a wide variety of oils in up to Sea State 4 conditions, to survive Sea State 6, and to return to operating at a spill scene without major repair. The disc-drum oil recovery device is supported afloat by a catamaran made of inflatable rubber pontoons. Machinery is installed in the twin hulls and in the cross-structure connecting them. Principal machinery components are the diesel prime mover, the four recovered-oil transfer pumps, and the hydraulic power transmission system power pumps and drive motors. The system is remotely controlled, refueled, and monitored through a 330-ft-long umbilical. Recovered oil is transferred through a 300-ft-long, 10-in.-diameter transfer hose to a distribution manifold onboard the tending vessel. The two-unit system is transportable in a Coast Guard HC-130-B aircraft, on a truck trailer, and onboard a wide variety of ships.

COM-75-11386/0GA PC$4.75/MF$2.25
National Oceanic and Atmospheric Administration, Miami, Fla. Atlantic Oceanographic and Meteorological Labs.
Assessment of Offshore Dumping in the New York Bight, Technical Background: Physical Oceanography, Geological Oceanography, and Chemical Oceanography.
Technical rept.,
Robert L. Charnell. Apr 75, 93p NOAA-TR-ERL-332, MESA-3 NOAA-75091803
Report on MESA New York Bight.

Descriptors: *Sludge disposal, *New York Bight, Ocean currents, Circulation, Sediments, Water pollution, Estuaries, Nutrients, Concentration(Composition), Inorganic nitrates, Inorganic phosphates, Carbon, Inorganic silicates, Carbohydrates, Sampling.
Identifiers: *Ocean dumping.

The report deals with the offshore dumping in the New York Bight, primarily its physical, geological, and chemical oceanographic effects. Physically, the analysis shows two distinct circulation regimes; (1) near the harbor mouth and along the New Jersey coast. New York Harbor discharge flows southward parallel to the New Jersey coast; at depth, there is a return flow of external water into the estuary. (2) Outside the region of strongest influence from river discharge, a persistent clockwise circulation or eddy appears to exist. Geologically, fine-grained waste dumped in New York Bight is entrained in a clockwise circulation pattern and is dispersed to the north. A significant portion is deposited in the low area (Christiaensen Basin) immediately northwest of the dumpsites. Chemically, the data from water sampling show that nutrient (nitrates, silicates, and phosphates) distributions are dominated by the lower New York Bay outflow, with dumped sewage sludge contributing very small amounts. Bottom grab samples were analyzed for total organic carbon and total carbohydrates.

COM-75-11412/4GA PC$5.75/MF$2.25
Greater Egypt Regional Planning and Development Commission, Carbondale, Ill.
Growth Center Strategy for The Greater Egypt Region: The Mt. Vernon Case.
Technical assistance rept.
Jun 75, 139p GERPDC-75-352 EDA-75-07

Descriptors: *Regional planning, *Economic development, Employment, Unemployment, Technical assistance, Industries, Land use, Public works, Transportation, Illinois.
Identifiers: *Growth centers, Mount Vernon(Illinois).

The objective of this report is to formulate a 'growth center strategy' of economic development which will have regional impact in increasing employment and reducing the number of low-income families. This report deals specifically with Mt. Vernon, and for this reason is not a comprehensive development plan for the Region. Exploiting potentials and alleviating constraints are the immediate objectives of the strategy. A series of proposed projects and

activities designed to facilitate achievement of these objectives is propounded. Report has five appendices.

E75-10417 PC$5.25/MF$2.25
Maine Dept. of Transportation, Augusta.
Multidisciplinary Analysis of Skylab Photography for Highway Engineering Purposes.
Final rept. Aug 73-Feb 75,
Ernest G. Stoeckeler, Raymond G. Woodman, and Robert S. Farrell. 28 Feb 75, 125p NASA-CR-141942
Contract NAS9-13359
Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Highways, Vegetation, Landforms, Terrain analysis, Hydrology, Land use, Ground truth, Maine, Coasts, EREP, Skylab program, Multispectral band cameras, Multispectral band scanners, Infrared photography.

The author has identified the following significant results. The greatly increased resolution of ground features by Skylab as compared with LANDSAT is considered to be best in the S190B high resolution film, followed by S190A camera stations 4, 5, and 6 respectfully. Results of the study of vegetation damage sites using data derived from S190A film were disappointing. The major cause of detection problems is the graininess of the CIR film. Good results were achieved for the hydrology-land use study. Both camera systems gave better agreement with the ground truth than did LANDSAT imagery. Surficial geology and glacial landform areas were clearly visible in single scenes. Several previously unmapped or unknown features were detected, especially in eastern coastal Maine.

JPRS-65891 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Methods for the Overall Evaluation of Air Pollution,
A. V. Primak. 9 Oct 75, 7p
Trans. of Gigiena i Sanitariya (USSR) n8 p81-84 1974.

Descriptors: *Air pollution, *Public health, Evaluation, Hazards, Methodology, Translations, USSR, Indexes.

The report contains a description of methods for the overall evaluation of air pollution in urban areas.

NTIS/PS-75/788/0GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Shipboard Sewage Treatment (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
Robena J. Brown. Oct 75, 53p*

Descriptors: *Sewage treatment, *Bibliographies, Design, Prototypes, Maintainability, Incinerators, Ships, Cost estimates, Chemical removal(Sewage treatment), Activated sludge process, Sewage filtration, Oxidizers, Catalysts, Aeration, Chlorination, Harbor, Sanitary engineering.
Identifiers: *Shipboard sewage treatment systems, Ocean waste disposal.

The bibliography includes research for new and effective designs of shipborne sewage treatment systems. The principal treatment methods are by chlorination, aeration, biological treatment, incineration, chemical removal, and activated carbon. Shipboard incinerators and sea disposal are also covered. (Contains 48 abstracts)

NTIS/PS-75/795/5GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Expansion Joints (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Guy E. Habercom, Jr. Oct 75, 70p*

Descriptors: *Bibliographies, *Expansion joints, Construction joints, Control joints, Concrete construction, Joints(Junctions), Abstracts.

Expansion joints relative to such widely separated applications as highways and spacecraft are reviewed in these Government-sponsored research reports. Highway and bridge applications are examined in Part 1. Miscellaneous applications such as railroads, underwater equipment, space vehicles, and artificial limbs, are investigated in Part 2.

NTIS/PS-75/829/2GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Roads and Runways: Snow Removal and Deicing Techniques (A Bibliography with Abstracts).
Rept. for 1964-Nov 75,
Robena J. Brown. Nov 75, 122p*
Supersedes NTIS/PS-75/061.

Descriptors: *Bibliographies, *Roads, *Runways, *Deicing, Highways, Snow removal, Technology, Water pollution, Cost analysis, Deicers, Corrosion, Ice control, Melting, Handling equipment, Maintenance, Degradation, Highway bridges, Chemical compounds.
Identifiers: Snowplows.

The bibliography covers research reports on materials, maintenance, costs, corrosion inhibition, pollution, and the planning applied to snow and ice removal. Applications cover bridges and railroads as well as highways and runways. (Contains 117 abstracts)

N75-31218/1GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Processing of Combined Domestic Bath and Laundry Waste Waters for Reuse as Commode Flushing Water.
W. D. Hypes, C. E. Batten, and J. R. Wilkins. Oct 75, 66p NASA-TN-D-7937, L-10034

Descriptors: *Chemical properties, *Physical properties, *Waste utilization, *Water reclamation, Bathing, Temperature effects, Washing, Water treatment.

For abstract, see STAR 1322

N75-31584/6GA PC$3.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Air Pollution from Aircraft.
Semiannual Progress Report, Feb. - Aug. 1975.
J. B. Heywood, and N. A. Chigier. 25 Aug 75 20p NASA-CR-145427
Contract NGR-22-009-378

Descriptors: *Air pollution, *Aircraft fuels, *Combustion efficiency, *Jet aircraft, *Jet exhaust, Carbon monoxide, Flow visualization, Fuel-air ratio, Gas turbine engines, Hot-wire anemometers, Wind tunnels, Mathematical models.

For abstract, see STAR 1322

N75-31585/3GA PC$3.75/MF$2.25
AeroChem Research Labs., Inc., Princeton, N.J.
No sub X Deposited in the Stratosphere by the Space Shuttle, Phase 1.
Final Summary Report.
H. S. Pergament, and R. D. Thorpe. Jul 75, 28p NASA-CR-132715, AEROCHEM-TN-161
Contract NAS1-13544

Descriptors: *Nitrogen oxides, *Rocket exhaust, *Space shuttles, *Stratosphere, Afterburning, Air pollution, Chemical composition, Computation, Mass flow, Reaction kinetics, Rocket nozzles, Solid propellant rocket engines.

For abstract, see STAR 1322

N75-31586/1GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Atmospheric Pollution. Part 1: Smoke and Sulfur Dioxide. Part 2: Precipitation Measurements Using Storage Gages Pollution Atmospherique I. Fumee et SO2 II.-Mesure des Retombees au Moyen des Jauges de Depot.
Monthly Bulletin, Aug. 1973.
Aug 73, 37p
Subm-Prepared Jointly with Inst. D'Hyg. Et d'Epidemiol.
In French and Dutch.

Descriptors: *Air pollution, *Belgium, *Precipitation (Meteorology), *Smoke, *Sulfur oxides, *Tables (Data), Air sampling, Rain gages, Weather stations.

For abstract, see STAR 1322

N75-31587/9GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Atmospheric Pollution. Part 1: Smoke and Sulfur Dioxide. Part 2: Precipitation Measurements Using Storage Gages Pollution Atmospherique I. Fumee et SO2 II.-Mesure des Retombees au Moyen des Jauges de Depot Bulletin Mensuel, Septembre 1973.
Monthly Bulletin, Sep. 1973.
Sep 73, 37p
Subm-Prepared Jointly with Inst. D'Hyg. Et d'Epidemiol.
In French and Dutch.

Descriptors: *Air pollution, *Belgium, *Precipitation (Meteorology), *Smoke, *Sulfur oxides, *Tables (Data), Air sampling, Rain gages, Weather stations.

For abstract, see STAR 1322

N75-31588/7GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Atmospheric Pollution. Part 1: Smoke and Sulfur Dioxide. Part 2: Precipitation Measurements Using Storage Gages Pollution Atmospherique I. Fumee et SO2 II.-Mesure des Retombees au Moyen des Jauges de Depot Bulletin Mensuel, Octobre 1973.
Monthly Bulletin, Oct. 1973.
Oct 73, 37p
Subm-Prepared Jointly with Inst. D'Hyg. Et d'Epidemiol.
In French and Dutch.

Descriptors: *Air pollution, *Belgium, *Precipitation (Meteorology), *Smoke, *Sulfur oxides, *Tables (Data), Air sampling, Rain gages, Weather stations.

For abstract, see STAR 1322

PAT-APPL-520 218/GA PC$3.25/MF$2.25
Environmental Protection Agency, Washington, D.C.
System for Dewatering Dilute Slurries.
Patent Application,
T. Lippert. Filed 1 Nov 74, 15p

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Sewage treatment, *Sludge disposal, *Dewatering, *Patent applications, Slurries.

The patent application discloses an improved system for dewatering dilute slurries. The system includes a spring-loaded sludge feed tray incorporating an adjustable flow splitter plug, along with spring-loaded sludge side guides. The sludge-cake compression section provides for a compression roller which is adjustable between two positions as a component in the backflushing of the sludge carrier screen using cake effluent. Also, a particular screen sludge solids loading range is employed which results in a significant improvement in performance and capacity of the dewatering system.

PB-244 912/2GA PC$8.50/MF$2.25
National Field Investigations Center-Denver, Colo.
Water Quality Investigations in the South Platte River Basin, Colorado, 1971-72.
Jun 72, 266p

Descriptors: *Water pollution, *South Platte River Basin, Surveys, Water quality, Objectives, Water pollution standards, Recommendations, Bacteria, Hydrology, Algae, Benthos, Chemical properties, Tables(Data), Colorado.
Identifiers: *Water quality data.

A comprehensive water quality investigation in the South Platte River Basin was conducted by the National Field Investigations Center-Denver. The objectives of the studies were to define water quality conditions in the South Platte River, to evaluate water pollution abatement practices, to evaluate progress toward compliance with the 1966 Conference in the Matter of Pollution of the South Platte River Basin, to determine whether Colorado Water Quality Standards have been violated, and to determine the need for abatement proceedings.

PB-244 936/1GA PC$5.25/MF$2.25
National Field Investigations Center-Denver, Colo.
Effects of Waste Discharges on Water Quality of the South Platte River Denver Metropolitan Area.
Jun 72, 118p

Descriptors: *Water pollution, *South Platte River, Surveys, Objectives, Water pollution standards, Recommendations, Bacteria, Suspended solids, Waste water, Nutrients, Chemical properties, Biochemical oxygen demand, Tables(Data), Colorado.
Identifiers: *Water quality data, Sewage effluents.

The primary objectives of the survey were to determine if established State and Federal water quality standards were being met, ascertain if adequate treatment were provided in accordance with established treatment requirements, determine the extent of water quality improvement in the South Platte River Basin since the 1966 State-Federal Enforcement Conference, and to recommend water quality improvement measures.

PB-244 943/7GA PC$5.75/MF$2.25
Georgia Univ., Athens. Dept. of Agricultural Engineering.
Pollution Aspects of Catfish Production. Review and Projections.
Environmental protection technology series,
James C. Barker, Jerry L. Chesness, and Ralph E. Smith. Jul 74, 131p EPA/660/2-74/064
Grant EPA-R-801662

Descriptors: *Water pollution, *Aquaculture, *Catfishes, Reviews, Concentration(Composition), Industrial wastes, Biochemical oxygen demand, Nitrogen, Sedimentation, Fishways, Lagoons(Ponds), Inorganic phosphates, Tables(Data), Georgia.

A literature review and field study was undertaken to determine the waste concentrations and discharge loadings occurring in the waters from catfish-culturing ponds and raceways. Water quality analyses were performed on samples taken during a 240-day growing season and at drawdown (assuming drainage at harvest). The natural biological degradation of the raw wastes in the ponds and raceway systems resulted in BOD reductions of 96.8% and 98.0% respectively when compared to waste levels produced in indoor single pass tank systems with no waste removal facilities. Reductions in total nitrogen of 97.2% and 97.7% occurred in ponds and raceways respectively, while ammonia nitrogen was reduced by 97.4% and 99.4% respectively. Sedimentation and biodegradation resulted in an 83.6% reduction in suspended solids in ponds and an 86.2% suspended solids reduction in raceways. Total phosphate levels were reduced by 98.5% and 97.4% in ponds and raceways respectively.

PB-245 116/9GA PC$4.25/MF$2.25
General Dynamics Corp., Groton, Conn. Electric Boat Div.
Storage of Wastes from Watercraft and Disposal at Shore Facilities.
Water pollution control research series,
Sheldon Cohen. Apr 70, 67p FWPCA-15020-DHB-03/70
Contract DI-14-12-509

Descriptors: *Sewage disposal, *Boats, *Water pollution control, *Storage tanks, Design, Sanitary engineering, Effectiveness, Test methods, Acceptability, Performance evaluation, Operating costs.

The program was undertaken to establish the effects and acceptability of a watercraft impoundment system in controlling the principal waste sources, sanitary and galley waste, with disposal at a shore facility. A demonstration unit was designed, built, and installed by Electric Boat on a commercial tugboat, and operationally tested and evaluated under routine working conditions for a period of two months. Results of the test data were analyzed, and component performance and system effectiveness were evaluated. Equipment and installation costs, as well as system operating costs, were identified. Sea water flushing was used for the water closets and urinal, but water conservation was used in the form of specially designed sanitary flush control and galley sink volume control devices to allow use of relatively small (120 gallon capacity) holding tank. The corrosion-resistant tank was provided with a level sensing system, an odor controlled vent line, an automatic flushing system, and a high level alarm. Shore-side transfer of the impounded wastes by suction pump-out of the tank via a quick-connect deck fitting was demonstrated. Solid galley waste was stored in a specially designed trash compactor. All components and subsystems performed effectively and reliably throughout the test phase.

PB-245 211/8GA PC$7.25/MF$2.25
Three Affiliated Tribes, Inc., Fort Berthold, N. Dak.
Fort Berthold Indian Reservation Bus Demonstration Project.
Final rept.,
John L. Crain, Peter G. Fitzgerald, and Fred C. Stoffel. Jan 74, 203p UMTA-ND-06-0001-75-1
Prepared by Crain and Associates, Menlo Park, Calif.

Descriptors: *Transportation, *American Indians, *Regional planning, Disadvantaged groups, North Dakota, Economic development, Social welfare, Distance, Demographic surveys, Systems analysis, Households, Questionnaires, Socioeconomic status, Improvement, Bus lines.
Identifiers: Indian reservations, Demonstration projects, Fort Berthold Indian Reservation, DOT/3 L, DOT/4CZ/CH.

A demonstration project was designed to develop and evaluate a transit system in a growing urban-rural Indian Region in Central North Dakota. Fort Berthold is a reservation of about 650 square miles, with an Indian population of approximately 2,774. The people reside mainly is five small towns. The distance from the main town to the most distant community is 110 miles. The primary concern of the project was to support the economic and social development of the entire region by interconnecting the various, and sometimes isolated communities with employment, commercial, medical, educational, and other centers of activity. An element of the project was to search for ways of incorporating all the transit services in the region into a package that would sustain the system at a point where it would become economically self-sufficient.

PB-245 230/8GA PC$3.80/MF$2.25
Transportation Research Board, Washington, D.C.
Pavement and Soil Characteristics,
C. L. Monismith. 1975, 90p* TRB/TRR-537, ISBN-0-309-02388-2

Descriptors: *Soil mechanics, *Foundations, *Pavements, Design, Pavement bases, Deformation, Shear stress, Soil compacting, Test methods, Triaxial tests, Bearing strength, Construction materials, Strain, Loads(Forces).

The papers in the Record contain information on soil characteristics useful for pavement design. They are of interest to soil engineers and highway designers. These papers include a presentation of an estimate of the contribution of the subgrade to the total permanent deformation of the pavement structure; a presentation of a new method of predicting permanent deformation of pavements through the use of mean normal stress and octahedral stress; a discussion of the four most commonly used materials for subbases; a review of the use of the Shell procedure for design of unbound granular material; a discussion of the results of an investigation of the effects of cycling confining stress; a presentation of a method for estimating the constrained soil modulus by use of compaction test parameters and field density results; and a presentation of a means of deriving satisfactory tangent moduli and Poisson's ratio for a given stress level from standard triaxial compression test data.

PB-245 262/1GA PC$8.50/MF$2.25
Cramer (H. E.) Co., Inc., Salt Lake City, Utah.
Diffusion-Model Calculations of Long-Term and Short-Term Ground-Level SO2 Concentrations in Allegheny County, Pennsylvania.
Final rept.,
H. E. Cramer, H. R. Geary, and J. F. Bowers. Mar 75, 271p EPA/903/9-75/018
Contract EPA-68-02-1387

Descriptors: *Air pollution, *Atmospheric diffusion, *Sulfur dioxide, Pennsylvania, Concentration(Composition), Mathematical models, Monongahela River Valley, Wind(Meteorology), Sources, Terrain.
Identifiers: *Allegheny County(Pennsylvania), Air quality data.

This report describes diffusion-model calculations of maximum 3-hour, 24-hour and average annual ground-level SO2 concentrations in Allegheny County produced by SO2 emissions

from 107 major stationary sources and source complexes located within or adjacent to the county boundaries. The 1973 emissions data were used with concurrent meteorological observations from the Greater Pittsburgh and Allegheny County Airports to calculate the 1973 average annual SO2 ground-level maximums, as well as the 3-hour and 24-hour maximums for three selected 24-hour periods. These 1973 model concentrations were compared with observed air quality data from continuous monitoring sites to confirm the accuracy of the modeling techniques prior to performing the compliance case calculations. As an additional check on the diffusion-modeling techniques, a numerical mesoscale wind-field model was used to determine the effects of the elevated terrain along the Monongahela River on the trajectories of SO2 plumes originating from the Clairton Coke Works during moderate to strong southwesterly flow.

PB-245 274/6GA PC$3.75/MF$2.25
Battelle Columbus Labs., Ohio.
Exploratory Study of Factors Affecting Aerosol Formation.
Ecological research series,
David F. Miller. Nov 74, 27p EPA/650/3-75/002
Contract EPA-68-02-1217

Descriptors: *Air pollution, *Smog, *Sulfur dioxide, Test chambers, Photochemical reactions, Oxidation, Sulfuric acid, Aerosols, Sulfates, Urban areas, Simulation.

A smog chamber study was completed to provide methodology and preliminary data on the rate of photooxidation of SO2 in environments simulating urban atmospheres. The experimental program included irradiation testing of clean air as well as air containing pollutants at concentration levels typical of those found in urban atmospheres. Results showed the rate of SO2 photooxidation to be unexpectedly as high as 5% per hour. Furthermore, the presence of deliberately injected pollutants did not seem to have a decisive effect on the SO2 photooxidation.

PB-245 308/2GA PC$4.25/MF$2.25
TRW/Environmental Services, Redondo Beach, Calif.
Implementation Plan Review for Washington as Required by the Energy Supply and Environmental Coordination Act.
Final rept.
Dec 74, 74p EPA/450/3-74/065
Contract EPA-68-02-1385

Descriptors: *Washington(State), Combustion products, Sulfur dioxide, Sources, Assessments, Standards, Revisions, Sulfur oxides, Nitrogen oxides, Fuel consumption, Electric power plants, Projects, Reviewing.
Identifiers: *State programs, *Implementation air pollution planning program, Air pollution abatement, Air pollution standards.

This document is EPA's report to the state indicating where control regulations for stationary fuel combustion sources can be revised without interfering with attainment and maintenance of the national ambient air quality standards. The changes would make it possible to alter fuel resource allocations to provide clean fuel savings in a manner consistent with environmental and national energy needs.

PB-245 309/0GA PC$3.25/MF$2.25
Environmental Protection Agency, Seattle, Wash. Region X.
Toward Cleaner Water in the Pacific Northwest and Alaska.
Final rept.
1975, 15p EPA/910/9-75/008

Descriptors: *Water pollution abatement, *Government policies, State government, National government, Cooperation, Alaska, Public relations, Regional planning, Cost analysis, Recommendations, Standards, Pacific Northwest Region(United States).
Identifiers: Standards compliance.

This report presents an evaluation and explanation of the National Pollutant Discharge Elimination System(NPDES) as it operates in Region 10 of the Environmental Protection Agency. It describes the complementary roles of state and federal government, and outlines the part which the general public plays. It is written for a lay audience.

PB-245 312/4GA PC$4.25/MF$2.25
Transportation Systems Center, Cambridge, Mass.
A Comparison of Methods for Evaluating Urban Transportation Alternatives.
Final rept.,
Leonard Bronitsky, and Joseph Misner. Feb 75, 62p DOT-TSC-UMTA-75-5 UMTA-MA-06-0053-74-1

Descriptors: *Urban transportation, Evaluation, Cost effectiveness, Benefit cost analysis, Methodology, Mass transportation.
Identifiers: DOT/1A.

The objective of the report was to compare five alternative methods for evaluating urban transportation improvement options: unaided judgmental evaluation cost-benefit analysis, cost-effectiveness analysis based on a single measure of effectiveness, cost-effectiveness analysis based on multiple measures of effectiveness, and scoring function methods. Each method was assessed within the framework of eight methodological criteria relating to the three major concerns of feasibility, reviewability, and relevancy. The following conclusions are drawn: (1) the judgmental method is satisfactory in several respects, but its subjectivity, lack of specificity might create difficulties in a federal review of the local decision process; (2) of the systematic evaluation methods, cost-effectiveness analysis based on multiple measures of effectiveness poses the fewest difficulties in simultaneously serving the local and federal purposes.

PB-245 341/3GA PC$3.25/MF$2.25
New Hampshire Univ., Durham. Dept. of Civil Engineering.
Aerobic Digestion of Wastewater Sludge Under Low Temperature Conditions,
Paul L. Bishop, and Lionel R. LePage. Mar 74, 18p W75-11709, OWRT-A-037-NH(1)
Presented at the Annual Environmental Engineering and Science Conference (4th), held at Louisville, Kentucky, on Mar 4-5, 1974.

Descriptors: *Sludge digestion, *Aerobic processes, *Sewage treatment, Winter, Biochemical oxygen demand, Stabilization, Waste water reuse, Dewatering, Efficiency, Odors, Settling, Filtration, Tests, New Hampshire.
Identifiers: Low temperature, Chemical oxygen demand.

The feasibility of winter operation of aerobic digesters in New Hampshire and other northern areas was examined. Small-scale laboratory experiments were conducted using continuous aeration, intermittent mechanical mixing, and a batch draw and fill operation, at six different temperatures ranging from 5 to 30C. Conclusions include: Greater reductions in BOD, COD, Total solids and Total volatile solids occur at higher temperatures; digestion for periods longer than 15 days achieved only minimal improvement in stabilization except at temperatures below 5C; the effect of temperature on the degree of stabilization was more significant at shorter detention times; no correlation was found between temperature and settleability of sludge; the settleability of treated sludge was less than that of raw sludge; higher temperatures of digestion improved the filterability of the treated sludge; filterability was decreased after 15 days digestion at higher temperatures; the filterability of digested sludge was not as good as that of the raw sludge; and, no disagreeable odor of the aerobically digested sludge was found during aeration or filtration.

PB-245 372/8GA PC$5.25/MF$2.25
Environmental Protection Agency, New York. Region II.
Documentation for HAR03. A Computer Program for the Modeling of Water Quality Parameters in Steady State Multi-Dimensional Natural Aquatic Systems. Second Edition.
Final rept.,
Steven Chapra, and George A. Nossa. Oct 74, 110p*

Descriptors: *Water quality, *Biochemical oxygen demand, *Estuaries, *Streams, Computer programs, Mathematical models, Steady state, Nutrients, Simulation, Flow charting, Subroutines.
Identifiers: *HAR03 computer program.

HAR03 is a computer program which can be used to model the steady-state distribution of water quality variables for multi-dimensional bodies of water. The technique underlying the program is based on the conservation of mass and up to two variables reacting in a feed forward fashion with first order kinetics may be modeled. This program was developed for analysis of the Biochemical Oxygen Demand (BOD) - Dissolved oxygen system, but with minor modifications the program can be used to model analogous variables such as chlorides, phosphates, coliform bacteria, etc.

PB-245 374/4GA PC$3.25/MF$2.25
Public Health Service, Washington, D.C. Div. of Water Supply and Pollution Control.
Report to the Advisory Committee on Revision of the Public Health Service 1946 Drinking Water Standards.
3 May 61, 23p

Descriptors: *Potable water, *Water quality, Standards, Concentration(Composition), Radioactive isotopes, Coliform bacteria, Public health, Selenium, Impurities, Barium.
Identifiers: *Water pollution standards.

The report recommends minimum requirements for reaching the goal of revising the drinking water standards. Among the new ideas introduced are limiting concentrations of radioactivity in water and adding limits for several new chemicals. The Committee strongly recommends establishing a mechanism for continual appraisal and appropriate revision of the Standards.

PB-245 375/1GA PC$3.75/MF$2.25
Public Administration Service, Chicago, Ill.
Staffing and Budgetary Guidelines for State Water Pollution Control Agencies. A Survey Report,
Thomas Jacobi, Richard Pavia, and E. F. Ricketts. Oct 64, 35p
Contract PH-86-64-140

Descriptors: *Water pollution, *Personnel, State government, Abatement, Financing, Requirements, Budgeting, Services.
Identifiers: Government agencies.

The study focuses upon personnel and financial requirements and the problem of water pollution control, concentrating on the state level.

PB-245 376/9GA PC$7.25/MF$2.25
California Univ., Davis.
Proceedings of the National Conference on Solid Wastes Management, Held at University of California, Davis on April 4 and 5, 1966.
Apr 66, 216p
Prepared in cooperation with Environmental Protection Agency, Washington, D.C. Office of Solid Waste Managements Programs.

Descriptors: *Solid waste disposal, *Meetings, Management planning, Systems analysis, Government policies, Regulations, Sanitary engineering, Refuse disposal, Water pollution control, Economics.

The conference proceedings cover all aspects of solid wastes management with a slant toward systems analysis. Legal, engineering, planning, political, business, and governmental facets are discussed.

PB-245 397/5GA PC$4.25/MF$2.25
Environmental Protection Agency, College, Alaska. Arctic Environmental Research Lab.
Design Considerations for Extended Aeration in Alaska,
Sidney E. Clark, Harold J. Coutts, and Conrad D. Christianson. Jul 70, 56p Working Paper-5
Presented at the International Symposium for Cold Regions Water Pollution Control, held at Alaska Univ., Institute of Water Resources on 22-24 July, 1970.

Descriptors: *Activated sludge process, *Aeration, *Sewage treatment, Lagoons(Ponds), Sludge disposal, Cold weather operations, Feasibility, Separation, Meetings, Design, Alaska.

The feasibility of the extended aeration activated sludge process as a relatively economical and effective means of secondary waste treatment has been demonstrated in the laboratory and in the field. The process requires more consistent operation and maintenance than aerated lagoons and this is a disadvantage where costs are high and skilled operators are extremely scarce. The utilization of exposed aeration chambers for the extended aeration process is feasible. Earthen basins are also feasible for use where economic and construction conditions warrant. Effective solids separation is the key to successful operation of extended aeration facilities and is dependent on both the biological and physical aspects of the system.

PB-245 572/3GA PC$4.75/MF$2.25
Oklahoma State Univ., Stillwater. Dept. of Agricultural Engineering.
Design and Operating Criteria for Rural Water Systems.
Master's thesis,
Gary Lynn Goodwin. 1973, 80p W75-12126, OWRT-B-028-OKLA(1)

Descriptors: *Water supply, *Rural areas, Demand(Economics), Classifications, Dairies, Water distribution, Design criteria, Pumping, Theses, Oklahoma.
Identifiers: Water distribution(Applied), Payne County(Oklahoma), Domestic water.

An analysis was made of the water usage in the Rural Water District No. 3, Payne County, Oklahoma. Customers were categorized on the apparent economic value of their residence and were classified as Class A, Class B, or dairies. The monthly usages of each of these groups were analyzed to obtain patterns of usage. The patterns of usage were then used to determine the values of daily demand and peak demand expected for type of user. There was a significant difference in the usage pattern for the three classes of customers. The average monthly usage per tap was 8768-19,138 gal for dairies, 4357-11,983 gal for Class A taps, and 2537-4160 gal for Class B taps. The average monthly usage per person ranged from 1424 to 2821 gal for Class A taps and from 989 to 1664 gal for Class B taps.

PB-245 580/6GA PC$7.50/MF$2.25
Battelle Columbus Labs., Ohio.
Study of Concepts for Minimizing Emissions from Coke - Oven Door Seals.
Final rept. Jun 74-Apr 75,
H. W. Lownie, Jr., and A. O. Hoffman. Jul 75, 235p EPA/650/2-75-064
Contract EPA-68-02-1439

Descriptors: *Coking, *Air pollution control, *Seals(Stoppers), Doors, Ovens, Design, Sources.

The report gives results of a study aimed at minimizing emissions from coke-oven door seals. It identifies problems associated with the sealing of slot-type coke oven end closures, and quantifies them to a limited degree by test results presented in the report. It analyzes coke-oven door sealing systems--those which have been developed in the past, as well as those currently in use--with respect to individual strengths and weaknesses. It develops and critically analyzes concepts to improve the seal design, and recommends the development of the two most favorable concepts.

PB-245 584/8GA PC$2.60/MF$2.25
Transportation Research Board, Washington, D.C.
Effect of Roadway Geometrics on Traffic Operations.
1975, 63p* TRB/TRR-541, ISBN-0-309-02394-7

Descriptors: *Vehicular traffic control, *Traffic safety, Intersections, Highways, Rural areas, Schools, Motor vehicle accidents.
Identifiers: Speed limits.

Traffic operations and traffic safety are influenced by roadway geometry, roadside development, and traffic control devices. The papers include (a) An analysis of accident experience on different roadway types in Kentucky; (b) a study of speeds in a rural zone as affected by several types of traffic control devices, including a dynamic speed violation sign; (c) a discussion of the nature of traffic operations at freeway lane drop locations and a presentation of several design principles that should be considered when such sites are constructed or reconstructed; (d) a survey of current practices in state, county, and city governments and a proposed methodology for dealing with specific cases of sight distance obstruction; (e) an examination of the knowledge about traffic-induced vibration; and (f) a study of accident occurrence for relationships

PB-245 585/5GA PC$3.75/MF$2.25
Transportation Research Board, Washington, D.C.
Roadside Hazards and Safety Improvements.
1975, 60p* TRB/TRR-543, ISBN-0-309-02396-3

Descriptors: *Highways, *Safety, Hazards, Rural areas, Motorcycles, Accidents, Accident investigations, Highway planning, Maintenance.

The papers in this Record are representative of several of the key elements of a highway safety evaluation system. They include: (a) A description of a formalized implementation procedure to program roadside safety improvements on controlled- and non-controlled-access highways; (b) a report on a procedure for identifying hazardous rural highway locations by using the quality control technique to calculate critical accident rates; (c) a description of the development of a quasi-coordinate link-node system for locating accidents; and (d) a description of the creation of a motorcycle accident data base that was used to determine accident causation factors, to identify voids in motorcycle accident information, and to suggest a basis for future educational and public information programs.

PB-245 587/1GA PC$6.25/MF$2.25
Little (Arthur D.), Inc., Cambridge, Mass.
Enhancing the Public Share of Highway Benefits.
Final rept. Nov 73-Nov 74,
Allan Sloan, and Martin Baker. Nov 74, 158p*
FHWA/SES-75/05
Contract FH-11-8214

Descriptors: *Highways, Eminent domain, Land use, Taxes, Zoning, Land development, Planning.
Identifiers: DOT/4CZ/CA.

To facilitate understanding, both hypothetical situations and actual experiences throughout the country are used to describe how proposed techniques of land-use control and taxation might affect certain situations. The techniques range from traditional measures to such innovations as floating zones, incentive zoning, transfer of development rights, and development taxation. The report also discusses the possibility that transportation agencies might plan for and implement 'benefit realization' schemes, which could include the acquisition of land beyond the right-of-way for subsequent disposition in accordance with official plans. But the authors recognize the political and legal difficulties in that approach and believe that it is more realistic to expect other governmental entities to exercise such authority in collaboration with transportation agencies.

PB-245 588/9GA PC$7.00/MF$2.25
Cornell Univ., Ithaca, N.Y.
Egg Breaking and Processing Waste Control and Treatment.
Final rept. 15 Jun 73-28 Aug 74,
W. J. Jewell, H. R. Davis, O. F. Johndrew, Jr., R. C. Loehr, and W. Siderewicz. Mar 75, 199p
EPA/660/2-75-019
Grant EPA-S-802174

Descriptors: *Eggs, *Food processing, *Water pollution control, *Solid waste disposal, Biochemical oxygen demand, Activated sludge process, Lagoons(Ponds), Anaerobic processes, Turbidity, Aeration, Poultry, Separation.
Identifiers: Chemical oxygen demand.

Eleven percent of the eggs produced in the U. S. are handled by egg breaking facilities to produce more than 800 million pounds of various egg products annually. Five egg breaking plants were sampled which covered a size ranging from small installations to one of the largest. The wastewater was highly contaminated, with total COD exceeding 6000 mg/l or greater. The product loss average was 12.5 percent of the weight of the processed product. Unit process losses were 0.034 kg BOD D sub 5 and 7.5 liters per kg of egg liquid produced. In-plant waste conservation methods were demonstrated to decrease BOD5 and wastewater volume losses by 50 and 24 percent, respectively. These reductions in product loss resulted in recovery of product with a value between $250 and $500 per day for a medium sized facility. Aerobic lagoons with 30 day HRT reduced the total COD from 5800 mg/l to 1000 mg/l. Of the four treatment systems tested, only a combination of an anaerobic lagoon followed in series with an aerated lagoon and a liquid solids separation step produced a dischargable effluent with soluble BOD D sub 5 less than 15 mg/l.

PB-245 593/9GA PC$5.75/MF$2.25
National Academy of Sciences, Washington, D.C.

Arid Lands of Sub-Saharan Africa.
Staff progress rept. Sep 73-Jun 74.
1975, 128p*
Contract AID/csd-2584
See also PB-245 594.

Descriptors: *Arid land, *Developing countries, *Foreign aid, *Africa, Droughts, Project planning, Natural resources, Management planning, International relations, Organizations, Meetings.
Identifiers: *SubSaharan Africa.

The Advisory Panel on Arid Lands of Sub-Saharan Africa of the Board of Science and Technology for International Development (BOSTIA) was appointed by NAS in late 1973 in response to a request from AID. The general purpose of the panel was to advise AID on problems of the drought-stricken region of West Africa, and to provide assistance in the design and implementation of U.S. participation in an international, collaborative, scientific effort currently being organized to address the emergency situation.

PB-245 594/7GA PC$3.75/MF$2.25
National Academy of Sciences, Washington, D.C.
Arid Lands of Sub-Saharan Africa.
Staff final rept. Jul-Dec 74.
1975, 50p*
Contract AID/csd-2584
See also PB-245 593, and PB-245 595.

Descriptors: *Arid land, *Developing countries, *Foreign aid, *Africa, Organizations, Meetings, Droughts, Project planning, Environments, Ecology, Climatology, Production planning, International relations.
Identifiers: *SubSaharan Africa.

A report is made by the NAS Advisory Panel on Arid Lands of Sub-Sahara Africa which deals with problems of the long-term development of the Sahel.

PB-245 595/4GA PC$8.75/MF$2.25
National Academy of Sciences, Washington, D.C.
Arid Lands of Sub-Saharan Africa.
Staff final rept.
1975, 286p*
Contract AID/csd-2584
See also PB-245 594.

Descriptors: *Arid land, *Developing countries, *Foreign aid, *Africa, Meetings, Chad, Mali, Mauritania, Niger, Senegal, Upper Volta, Communications management, Land development, Agriculture, Livestock, Climatology, Transportation, Industries, Sociometrics, Health.
Identifiers: *SubSaharan Africa, Sahel(Africa).

A report is made on a 1974 conference on development problems in the Sahel, in Bellagio, Italy. The report is based on analysis and integration of ideas from a large number of proposals for development and aid to the nations of the Sahel. A survey and a critique are made of plans for development in the following areas: communication, transportation, dryland crop production, irrigated crop production, livestock and range production, technological and industrial developments, sociocultural and health developments, and institutional, policy, and economic structural development.

PB-245 607/7GA PC$4.25/MF$2.25
KLD Associates, Inc., Huntington, N.Y.
Design, Development, and Field Test of a Droplet Measuring Device.
Final rept. Jun 73-Jun 74,
Hector Medecki, Myron Kaufman, and Daniel E. Magnus. Feb 75, 57p EPA/650/2-75/018
Contract EPA-68-02-1309

Descriptors: *Air pollution, *Drops(Liquids), *Size determination, Electric measuring instruments, Monitors, Design, Demisters, Gas flow, Flue gases, Electric power plants, Field tests, Temperature, Prototypes.
Identifiers: Air pollution detection.

The report describes the design, development, and field testing of a concept to measure liquid droplets in the size range from 1 to 600 micrometers. The measurement probe is a platinum wire 5 micrometers in diameter. With the probe electrically heated to a predetermined temperature, changes in the probe resistance are related to the size of the impinging droplets in the gas flow. The electrical signals from the probe are processed and used to classify the droplets into six different size ranges or bins. Two prototypes, consisting of the probe and electronic processing unit, were constructed and tested in the field. Actual droplet distributions and concentrations were measured successfully.

PB-245 610/1GA PC$4.75/MF$2.25
Mitre Corp., McLean, Va.
SIMS Implementation Handbook. Service, Inventory and Maintenance System,
Robert L. Scott. Dec 74, 93p MTR-6798 UMTA-VA-06-0004-75-1
Contract DOT-UT-10005
See also report dated Oct 73, PB-241 495.

Descriptors: *Bus lines, *Urban transportation, *Maintenance management, *Systems engineering, Automation, Management information systems, Services, Inventory control, Cost engineering, COBOL, Data processing, Computer programming.
Identifiers: SIMS(Service Inventory and Maintenance System), Service inventory and maintenance system, DOT/3I.

The Service, Inventory, and Maintenance System (SIMS) has been developed to aid urban bus transit properties in managing their servicing and maintenance activities. This automated information system is currently operational and consists of three components: the Service/Unit Change System, Inventory System, and Repair Cost System. General descriptions of the system's data requirements and the reports it produces have been published, and detailed software documentation is available for each of the three components. This handbook furnishes guidance to management in planning the implementation of the SIMS components at individual properties, by outlining such steps as data base generation, training, and acquisition of data processing services.

PB-245 619/2GA PC$4.25/MF$2.25
Environmental Research Inst. of Michigan, Ann Arbor.
The Application of Remote Sensing Technology to Local Environmental Planning and Public Policy Formulation.
Final summary rept. Jun 72-Nov 74,
R. Keith Raney. Jun 75, 62p* ERIM-193500-6-F
NSF/RA/E-75/035
Grant NSF-GI-34809
See also PB-244 517, and PB-245 620.

Descriptors: *Remote sensing, *Technology, *Regional planning, Environments, Information systems, Photointerpretation, Technology innovation, Organizations, Predictions, Evaluation, Policies, Urban areas, Aerial surveys, Michigan.

The objective of this project was to assist in increasing the effectiveness of public planning agencies through innovative use of the technology of remote-sensing information systems. This report is the Final Summary Volume of a series prepared for the project. The principal tasks, described generally in this report and in more specific terms in the various Task Force Reports, included: (1) determination of the present sources, content, and flow of information within and between selected agencies, (2) introduction of remotely sensed information into these agencies and (3) assessment of the actual and likely future impact of such information on public decisions effected by the agencies.

PB-245 620/0GA PC$7.00/MF$2.25
Environmental Research Inst. of Michigan, Ann Arbor.
Inland Lakes Water Quality and Watershed Planning: Remote Sensing Technology Applications.
Final rept. May 71-Jun 74,
T. Borton, C. T. Wezernak, and R. K. Raney. Jun 75, 189p* ERIM-193500-6-F1 NSF/RA/E-75/036
Grant NSF-34809
See also PB-245 619, and PB-245 621.

Descriptors: *Land development, *Regional planning, *Watersheds, *Water quality management, *Remote sensing, *Water resources, Technology, Impact, Information systems, Policies, Land development, Data acquisition, Decision making, Local government, Lakes, Nutrients, Problem solving, Michigan.
Identifiers: Eutrophication.

This is the final report of a task force exploring the impact of remote sensing and other information systems on public planning and policy decisions related to land development within the drainage basin of a small inland lake. The issue is one of maintaining water quality in the face of pressure to increase the cultural use of the watershed. The approach of the Task Force was three-fold: (1) to gather, interpret, and provide information regarding the issue to local decision makers; (2) to assist in motivating a common problem recognition among the local people; and (3) to withdraw from the local area, leaving behind sufficient technical resources to meet the needs of local initiatives to action, and to observe early phases of changed environmental decision-making.

PB-245 621/8GA PC$4.75/MF$2.25
Environmental Research Inst. of Michigan, Ann Arbor.
The Prospects for Improving Highway Planning Through Remote Sensing Information Systems: A Case Study for Michigan.
Final rept. Jun 72-Nov 74,
A. N. Sellman, and K. P. Warner. Jul 75, 90p*
ERIM-193500-6-F2 NSF/RA/E-75/037
Grant NSF-GI-34809
See also PB-245 620.

Descriptors: *Remote sensing, *Highway planning, *Information systems, Coordination, Organizations, Guidelines, Project planning, Technology, Environments, Evaluation, Objectives, Models, Technology innovation.

This volume is the final report of a three year study funded by the National Science Foundation to identify and measure the impact of remote sensing on highway planning objectives. During that time the Environmental Research Institute of Michigan (ERIM) maintained a cooperative research program with the Michigan Department of State Highways and Transportation (MDSH&T) to focus on three major issues facing highway planners today: (1) the traditional problem of coordinating many divisions to achieve an integrated planning goal, (2) the institutional and programmatic reorganization engendered by the Action Plan guidelines of the Federal Highway Administration, and (3) the capacity of contemporary remote-sensing technologies to supply environmental information required for highway planning as practiced today.

PB-245 623/4GA PC$3.75/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
Effluent Variability in the Meat-Packing and Poultry Processing Industries,
James F. Scaief. Jun 75, 46p Working Paper-16-75

Descriptors: *Water pollution, *Industrial wastes, *Food processing, Meat, Poultry, Industrial waste treatment, Sampling, Biochemical oxygen demand, Waste water, Industrial plants, Seasonal variations, Weather, Performance.
Identifiers: *Water quality data, Suspended solids, *Poultry processing industry, *Meat packing industry.

Long-term BOD 5 and suspended solids (SS) wastewater quality data on six meat-packing and four poultry processing plants was analyzed with respect to its variability. Results were compared to the discharge limitations for the respective industry categories and parameters.

PB-245 645/7GA PC$3.75/MF$2.25
Urban Inst., Washington, D.C.
Implementing Shared Taxicab Services. A Case Study in Arlington, Virginia,
Ronald F. Kirby. Feb 75, 45p* UI-5051-10 UMTA-DC-06-0093-75-1
Contract DOT-UT-40008

Descriptors: *Urban transportation, *Planning, Passenger vehicles, Services, Urban areas, Travel demand, Economic analysis, Management, Virginia.
Identifiers: Arlington County(Virginia), Paratransit, Shared ride taxi systems, *Taxicabs, DOT/4DZ/DB, DOT/1A.

Recent research has suggested that significant improvements in urban mobility could be achieved by allowing taxicabs to offer a variety of shared-ride services, for which passengers with different trip origins or destinations can share the same taxicab. Local regulations in most urban areas in the U.S. have historically discouraged or prohibited such services, however. Arlington County, Virginia, recently decided to introduce shared taxicab services on an experimental basis, with a view to their eventual implementation as a permanent new form of public transportation for the county. This paper discusses the motivation for this experiment, the issues and problems encountered in designing it, and the specific service provisions and fare structure adopted. The paper also outlines measurement procedures designed to assist Arlington County in evaluating the experiment.

PB-245 659/8GA PC$9.25/MF$2.25
Baker (Michael), Jr., Inc., Beaver, Pa.
Evaluation of the Environmental Impact to Appalachian Pennsylvania Waters of the 1972 Flood and Subsequent Stream Channelization with Future Policy Recommendations.
Final rept.
Sep 75, 315p ARC-73-185-2562
Grant ARC-73-185
Prepared in cooperation with Pennsylvania Dept. of Environmental Resources, Harrisburg, and Pennsylvania Fish Commission, Harrisburg.

Descriptors: *Flood control, *Hurricanes, Appalachia, Environmental impacts, Regional planning, Tropical cyclones, Streams, Channel improvements, Pennsylvania, Biological surveys, Watersheds, Civil engineering, Ecology, Social effect, Economic factors, Geological surveys, Fishes, Recommendations.
Identifiers: Tropical storm Agnes.

Geologic, engineering and biological investigations of six coldwater Pennsylvania streams were undertaken to determine the impact of Tropical Storm Agnes and both pre- and post-flood stream channelization. The primary focus of the study was the ecological changes brought about by channel modification. No long-term deleterious effects of stream channelization on water quality, attached algae, benthic fauna or forage fish populations were found. Stream channelization was found to be often performed with a lack of adequate planning and supervision. A comprehensive planning process, as well as other recommendations, is set forth.

PB-245 662/2GA PC$3.25/MF$2.25
Tri-State Regional Planning Commission, New York.
Regional Profile. The Expressway Connection. Volume III. Number 1.
Regional profile rept.
May 75, 9p TS-8022
See also report dated Apr 75, PB-245 661.

Descriptors: *Regional planning, *Interstate highway system, Limited access highways, Construction, Vehicular traffic.

Expressway 'stub ends' should be completed in order to get the most out of public dollars that have already been spent. This was significantly demonstrated through a systemwide analysis of roadways in the Morristown area after the opening of a four-mile segment of Interstate 287 in Morris County. Opening the missing segment has alleviated congestion on the north-south roadways--U.S.202, N.J.53, Whippany and Parsippany roads and on the east-west routes--N.J.10 and County 510. Total costs of vehicular travel in the Morristown area--including time, accident and operating costs, plus payment for land and construction costs--are now lower per unit of travel than before.

PB-245 667/1GA PC$3.75/MF$2.25
Strong Wishart and Associates, Inc., San Francisco, Calif.
Freight Car Planning: Final System Plan, United States Railway Association.
Jun 75, 29p USRA/R-007-2
Contract USRA-50054

Descriptors: *Rail transportation, *Freight cars, *Planning, Forecasting, Finance.
Identifiers: Conrail system, Consolidated railroads.

The report uses the financial results from the Final System Plan forecasts to evaluate freight car planning for four potential Conrail entities. The entities are MARC-EL, Penn Central/Ann Arbor, Conrail IV, and Conrail V. Changes in assumptions and data sources for freight car equipment forecasts are included. Final System Plan forecasts, the interim financials, and the increase of the two are given. Financial summary and equipment utilization for 1976-1985 are forecasted. Updates earlier volume (PB-239 037) dated Jan. 1975.

PB-245 676/2GA PC$4.75/MF$2.25
San Diego Transit Corp., Calif.
Mass Transit Research. A Bibliography with Special Emphasis on Bus Transit and with Annotations.
Final rept.,
Rebecca Wood, and Dinoo J. Vanier. Jun 75, 94p* SD/UMT/CA-09/0023/75-1
See also PB-245 677. Prepared in cooperation with San Diego State Univ., Calif. School of Business Administration.

Descriptors: *Urban transportation, *Mass transportation, *Bibliographies, Buses(Vehicles), Passenger transportation, Marketing, Travel demand, Research.

The bibliography includes nearly 700 entries, several of them in annotated form, covering the Papers, Articles, Books, Reports, and other Studies that have been undertaken by various individuals and organizations in the areas of mass transit and especially in the marketing aspects of urban transportation. Special focus is directed toward the field of bus transit. It is a valuable reference tool for persons interested in acquiring a knowledge of the progress that has been made in mass transit research.

PB-245 677/0GA PC$4.25/MF$2.25
San Diego Transit Corp., Calif.
Mass Transit Research. Perspectives, Past and Present.
Final rept.,
Dinoo J. Vanier. Jun 75, 75p SD/UMT/CA-09/0023/75-2
See also PB-245 676. Prepared in cooperation with San Diego State Univ., Calif. School of Business Administration.

Descriptors: *Urban transportation, *Mass transportation, Buses(Vehicles), Passenger transportation, Marketing, Travel demand, Socioeconomic status, Research.
Identifiers: Modal split models.

The report examines the research, the literature available on areas of vital concern to transportation planners and marketing analysts alike--those which reflect the nature of transportation demands and the characteristics and usage patterns of trip-makers, including both transit users and non-users. The review concentrates on the methodological approaches, the data obtained, and the findings presented by different researchers. Special emphasis devoted to examining the various studies that have been undertaken in recent years on the viability of bus transit as a mode of public transportation. A comparative analysis is made of the objectives, the procedures employed, and the conclusions drawn by each such study.

PB-245 687/9GA PC$5.75/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.
Municipal Information Systems: Evaluation of Policy Related Research. Volume I. Summary of Research Findings for Policymakers.
Final rept.,
Kenneth L. Kraemer, and John Leslie King. Aug 75, 138p* NSF/RA/S-74/037
Grant NSF-GI-39068
See also Volume 2, PB-245 688.

Descriptors: *Local government, *Information systems, *Government policies, Data acquisition, Municipalities, Decision making, Data processing, Methodology, Reviews, Computer programming, Planning, Management engineering, Financing, Public administration, Manpower utilization, Personnel management, Technology, Security, Research.
Identifiers: Policy making, Counties, Urban information systems.

This report summarizes the findings of a study called an Evaluation of Policy Research in Information Systems (EPRIS). This project was carried out in 1975 by The Public Policy Research Organization and supported by a grant from the National Science Foundation. The purpose of the EPRIS Project was to collect and study all the available research on information systems that might be helpful to local government executives, including mayors, city managers, county chairmen, county executives, and city and county department heads. In addition, the work was directed toward the needs of staff who support executive decision makers, toward data processing personnel, and toward those who set policy for funding local government data processing development.

PB-245 688/7GA PC$7.25/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.

Municipal Information Systems: Evaluation of Policy Related Research. Volume II. Computer Utilization in Local Government.
Final rept.,
Kenneth L. Kraemer, Henry C. Lucas, Richard D. Hackathorn, and Robert C. Emrey. Sep 74, 212p* NSF/RA/S-74/037A
Grant NSF-GI-39068
See also Volume 1, PB-245 687 and Volume 3, PB-245 689.

Descriptors: *Local government, *Information systems, *Government policies, Computer programming, Data processing, Technology, Utilization, Systems analysis, Trends, Research, Objectives, Recommendations, Surveys, Municipalities, Evaluation, Benefit cost analysis, Econometrics.
Identifiers: Policy making, Urban information systems.

Volume 2 is one of 10 volumes evaluating policy-related research on municipal information systems. It discusses what is currently known about computer utilization in municipal and county governments. This report provides a comprehensive review and critical evaluation of existing research and recommends goals for future studies. Research is systematically reviewed for validity and policy utility, determined by its contribution to information about national trends, local benchmarks, effectiveness, transferability, cost/benefits, and systems design. Studies are divided into categories of stock (supply and utilization of computer resources) and need (demand for information and data processing capability).

PB-245 689/5GA PC$7.25/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.
Municipal Information Systems: Evaluation of Policy Related Research. Volume III. Information Systems Procurement, Computer Resource Allocation, and Finance Policy.
Final rept.,
Edward Schrems, and George Duggar. Sep 74, 223p* NSF/RA/S-74/037B
Grant NSF-GI-39068
See also Volume 2, PB-245 688 and Volume 4, PB-245 690.

Descriptors: *Local government, *Information systems, *Government policies, Data processing, Computer programming, Financing, Reviews, Research, Evaluation, Prices, Decision making, Allocations, Benefit cost analysis, Municipalities.
Identifiers: Policy making, Urban information systems.

Volume 3 is one of 10 volumes evaluating policy-related research on municipal information systems. It discusses alternatives for acquiring, financing, and allocating computer resources in budget and cost terms. Advice is provided to decision makers for analyzing alternatives and the full range of steps in financial analysis is discussed. Research on ways of financing computer activities is studied, although none is presented as preferable. The research reviewed on allocation centers on pricing schemes of university computing centers. Future research is recommended.

PB-245 690/3GA PC$5.75/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.
Municipal Information Systems: Evaluation of Policy Related Research. Volume IV. Computing Technology and Information Management Policy.
Final rept.,
Richard D. Hackathorn. Sep 74, 136p* NSF/RA/S-74/037C
Grant NSF-GI-39068
See also Volume 3, PB-245 689 and Volume 5, PB-245 691.

Descriptors: *Local government, *Information systems, *Government policies, Computer programming, Management engineering, Technology, Research, Reviews, Evaluation, Information retrieval effectiveness, Systems analysis, Municipalities.
Identifiers: Policy making, Data bases, Urban information systems.

Volume 4 is one of 10 volumes evaluating policy-related research on municipal information systems. It discusses technologies for information management, which include data base management systems, distributed computing, system building, and geoprocessing. Steps for local officials to develop and implement information management policies are presented. Research findings treat the shift in emphasis from computer-centered views of information management to data-centered views that stress the value of information on an organization-wide scale. Future research needs are indicated.

PB-245 691/1GA PC$9.25/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.
Municipal Information Systems: Evaluation of Policy Related Research. Volume V. Disclosure, Privacy, and Information Policy.
Final rept.,
Frances I. Mossman, and John Leslie King. Sep 74, 309p* NSF/RA/S-74/037D
Grant NSF-GI-39068
See also Volume 4, PB-245 690 and Volume 6, PB-245 692.

Descriptors: *Local government, *Information systems, *Government policies, Security, Methodology, Guidelines, Recommendations, Research, Attitudes, Public relations, Impact, Decision making, Evaluation, Municipalities.
Identifiers: Policy making, Urban information systems.

Volume 5 is one of 10 volumes evaluating policy-related research on municipal information systems. It discusses the clash between disclosing and withholding government information on individuals and organizations. Based on a survey of existing literature, it describes computer impacts as a threat to privacy, and the use of the computer as a means to protect privacy by the control of data. It presents steps local officials can take to develop and implement information policies and programs. All issues are considered from the perspective of information policy. Existing research is criticized for inadequacies in conceptual formulation, understanding of public attitudes and behavior, application of legal doctrine, data about impacts, evaluation of the effectiveness of solutions, and policy framework. Future research procedures are suggested.

PB-245 692/9GA PC$8.75/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.
Municipal Information Systems: Evaluation of Policy Related Research. Volume VI. Automation, Work, and Manpower Policy.
Final rept.,
Annabelle Sartore, and Kenneth L. Kraemer. Sep 74, 283p* NSF/RA/S-74/037E
Grant NSF-GI-39068
See also Volume 5, PB-245 691, and Volume 7, PB-245 693.

Descriptors: *Local government, *Information systems, *Government policies, Computer programming, Social effect, Automation, Personnel management, Manpower utilization, Municipalities, Guidelines, Impact, Government employees, Models, Research, Job satisfaction, Decision making, Salary surveys.
Identifiers: Policy making, Urban information systems, Alternatives.

Volume 6 is one of 10 volumes evaluating policy-related research on municipal information systems. It discusses the range of possible impacts on people, jobs, and organizational structures resulting from the introduction and use of computer-based information systems. A review, evaluation, and synthesis of existing research provided the basis for information on policy formulation, program development and implementation, and future research. Specific policy alternatives for staffing, wages and salaries, and training are related to the municipal decision making process. The steps local officials can take to develop and implement policies and programs are presented as an integral part of total organization and information system design, rather than merely as a response to it. Intensive work on alternative research strategies and issues is also emphasized.

PB-245 693/7GA PC$7.50/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.
Municipal Information Systems: Evaluation of Policy Related Research. Volume VII. Information Functions, Services, and Administrative Policy.
Final rept.,
Joseph R. Matthews. Sep 74, 243p* NSF/RA/S-74/037F
Grant NSF-GI-39068
See also Volume 6, PB-245 692 and Volume 8, PB-245 694.

Descriptors: *Local government, *Information systems, *Government policies, Information retrieval effectiveness, Services, Public administration, Evaluation, Organizations, Guidelines, Recommendations, Decision making, Reviews, Research, Computer programming.
Identifiers: Policy making, Urban information systems.

Volume 7 is one of 10 volumes evaluating policy-related research on municipal information systems. It discusses the impact of different organizational arrangements on the information functions served and services provided in municipal administration. It presents steps for local officials to develop and implement administrative policy, the nexus of all other policy concerns in this series. The development of this policy is related to the municipal decision making process and municipal-wide data uses. Although it offers some guidance for planning, designing, implementing, and managing computer-based information systems, the research reviewed appears inadequate. Future research requires a policy framework, model procedures for information systems planning and implementation, a method for rating systems and services within and between organizations, identification of the critical variables in the man-machine interface, and the correlates of project and system success.

PB-245 694/5GA PC$5.25/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.
Municipal Information Systems: Evaluation of Policy Related Research. Volume VIII. Policy Concerns in Municipal Information Systems: Results of a Delphi Experiment.
Final rept.,
John Leslie King, and Kenneth L. Kraemer. Sep 74, 104p* NSF/RA/S-74/037G
Grant NSF-GI-39068
See also Volume 7, PB-245 693 and Volume 9, PB-245 695.

Descriptors: *Local government, *Information systems, *Government policies, Municipalities, Questionnaires, Surveys, Computer programming, Opinions, Data processing, Reviews, Comparison, Systems engineering, Classifications.
Identifiers: Policy making, Delphi technique, Urban information systems.

Volume 8 is one of 10 volumes evaluating policy-related research on municipal information systems. It discusses a 2-round Delphi-type survey designed to solicit issues of concern to policy makers, users, and designers of computer-based information technology in local government. A list of 40 policy issues was generated and presented in two contexts: as they related to 9 topics in municipal information systems and as they fit into the structure of information systems building. This list was compared to a list of policy concerns taken from research literature and was found to be similar. The second round used the same panel to rank the 40 policy issues by relative importance for policy makers. Responses from panelists familiar with EDP were analyzed and compared with those from panelists less familiar with EDP. A similar analysis was conducted by occupation of respondents.

PB-245 695/2GA PC$5.75/MF$2.25
California Univ., Irvine. Urban Information Systems Research Group.
Municipal Information Systems: Evaluation of Policy Related Research. Volume IX. Methodology for Evaluation of Research in Municipal Information Systems.
Final rept.,
Kenneth L. Kraemer, and John Leslie King. Sep 74, 150p* NSF/RA/S-74/037H
Grant NSF-GI-39068
See also Volume 8, PB-245 694.

Descriptors: *Local government, *Information systems, *Government policies, Research, Evaluation, Municipalities, Criteria, Classifications, Reviews, Project planning, Guidelines, Methodology, Reporting, Surveys, Opinions, Questionnaires, Validity, Computer programming.
Identifiers: Policy making, Urban information systems.

Volume 9 is one of 10 volumes evaluating policy-related research on municipal information systems. It discusses the methodology used in this evaluation study. Included are the criteria for selection of the five major policy concerns for municipal information systems: EDP investment and finance, privacy and data control, organizational arrangements, technical approaches to system building, and manpower impacts. Also discussed are the criteria for selecting a piece of literature for review, and the sequence of project tasks. Several appendices are included which discuss assessment procedures and guidelines for preparation of study reports. Portions of this document are not fully legible.

PB-245 732/3GA PC$3.75/MF$2.25
Federal Water Quality Administration, Washington, D.C. Div. of Technical Support.
Inventory of Municipal Waste Facilities in the United States (1968). Statistical Summary.
1968, 49p
See also PB-216 108.

Descriptors: *Sewage treatment, *Sewage disposal, Municipalities, Statistical analysis, United States.

The publication presents a summary and analysis of data on sewage disposal and treatment facilities in the United States and territories.

PB-245 739/8GA PC$5.75/MF$2.25
Public Health Service, Washington, D.C. Div. of Water Supply and Pollution Control.
Industrial Water Use,
Willis G. Eichberger. Feb 65, 130p

Descriptors: *Water pollution, *Industrial water, *Water supply, Waste water reuse, Estimating, Statistical data, Tables(Data), Surveys, Requirements.
Identifiers: Water utilization.

The data presented in chart form is to establish a base for estimating present industrial water use requirements and waste loadings by type of manufacturing industry and to provide a base from which valid projections of industrial water use requirements can be made.

PB-245 740/6GA PC$3.25/MF$2.25
Federal Water Pollution Control Administration, Cincinnati, Ohio. Div. of Technical Support.
Pre-Impoundment Biological Survey of Stockton Reservoir-Sac River, Missouri, August, 1968,
Nelson A. Thomas. 1969, 8p

Descriptors: *Water pollution, *Stockton Reservoir, *Aquatic biology, Surveys, Aquatic animals, Benthos, Marine microorganisms, Dissolved gases, Oxygen, Inorganic nitrates, Inorganic phosphates, Nutrients, Missouri.
Identifiers: *Water quality data, Dissolved oxygen.

The purpose of the investigation was to obtain information on the aquatic communities inhabiting the reservoir site and downstream waters. The data obtained are used to predict biological changes that may occur in the reservoir, and for future evaluation of changes in the aquatic life within and downstream from the reservoir after impoundment.

PB-245 741/4GA PC$3.75/MF$2.25
Oregon State Univ., Corvallis. Dept. of Physics.
Report on Cooling Towers and Weather to Federal Water Pollution Control Administration,
Fred W. Decker. Feb 69, 30p
Prepared in cooperation with Federal Water Pollution Control Administration, Corvallis, Oreg. Pacific Northwest Water Lab.

Descriptors: *Cooling towers, *Fog, Water pollution control, Thermal pollution, Weather, Evaporative cooling, Sites, Weather modification.

The report recounts an investigation into the theory and reports of actual operations of various cooling towers suggesting that in suitable sites the bad effects will not occur. It also suggests the methods for identifying potentially hazardous or nuisance situations so as to avoid selecting them inadvertently for new installations.

PB-245 743/0GA PC$7.25/MF$2.25
Consumer Protection and Environmental Health Service, Washington, D.C.
Issue Study on Solid Wastes.
Aug 69, 221p

Descriptors: *Solid waste disposal, *Management planning, Government policies, National government, State government, Local government, Reclamation, Financing, Urban planning, Storage, Transportation, Manpower, Refuse disposal, Economic analysis, Evaluation.

The report is concerned with the management of solid wastes, especially with those factors unique to the field-mobility and pollution abatement and control.

PB-245 747/1GA PC$3.75/MF$2.25
Public Health Service, Washington, D.C. Div. of Water Supply and Pollution Control.
Statement for Comprehensive Water Pollution Control Programs,
Keith S. Krause. 1963, 34p

Descriptors: *Water pollution abatement, Project planning, River basin development, Water supply, Chesapeake Bay, Susquehanna River, Columbia River, Delaware River, Great Lakes, Illinois River, Ohio River, Arkansas River, Red River.

River basin projects are described, specifically the Chesapeake Bay-Susquehanna, the Columbia, the Delaware, the Great Lakes-Illinois, the Upper Ohio, and the Arkansas-Red Rivers Basins. Future plans are outlined along with a plan for comprehensive water pollution control.

PB-245 750/5GA PC$4.75/MF$2.25
Public Health Service, Washington, D.C. Div. of Water Supply and Pollution Control.
Statistical Summary, 1956 Inventory of Municipal Water Facilities in Cities Over 25,000 Population.
28 Mar 58, 83p
See also PB-218 254.

Descriptors: *Water supply, *Municipalities, *Water treatment, Inventories, Tables(Data), Water treatment, Population(Statistics), United States, Industrial plants, Hawaii, Alaska.

The summary report is in the form of tables which are organized into two distinct groups. Group 'A' presents the totals for U.S.-including Hawaii and Alaska. Group 'B' presents the same information in a total for each state.

PB-245 752/1GA PC$3.25/MF$2.25
Public Administration Service, Chicago, Ill.
Water Pollution Control Administration. A Memorandum Report on a Reconnaissance Study,
E. F. Ricketts, Thomas Jacobi, and Ronald Johnson. Apr 63, 22p

Descriptors: *Water pollution, *Planning, Surveys, Recommendations, Predictions, National government, State government, Local government, Legislation, Financing.
Identifiers: *Water pollution abatement, Intergovernmental relationships.

The report discusses water pollution control as it is now, the form it should take in the future, and plans for future study. Local, state, and national plans are discussed including aspects such as cooperation on all levels, finances, legal problems, public relations, planning, and enforcement.

PB-245 753/9GA PC$4.25/MF$2.25
Public Health Service, Washington, D.C. Div. of Water Supply and Pollution Control.
Statistical Summary of Municipal Water Facilities Communities of 25,000 Population and Over, as of January 1, 1960.
Jan 60, 60p
See also PB-230 526.

Descriptors: *Water supply, *Municipalities, *Water treatment, Inventories, Tables(Data), Population(Statistics), Industrial plants, United States, Hawaii, Alaska.

The tables summarize the information collected by the Public Health Service in the biennial inventory of water facilities in the larger cities of the U.S. All tables show data by population size groups and major drainage basin.

PB-245 754/7GA PC$4.25/MF$2.25
Duke Univ., Durham, N.C.
A Survey of Air Pollution Litigation in the Philadelphia Area.
Final rept.
10 Dec 69, 57p
Contract CPA-22-69-112

Descriptors: *Air pollution, *Economic impact, Damage assessment, Cost benefits, Management information systems, Methodology, Surveys, Litigation, Pennsylvania, Metropolitan areas.

Identifiers: *Air pollution abatement, Compensable damages, Case studies, Legal aspects, *Philadelphia(Pennsylvania).

The study deals in part with using legal measures for the purpose of making or confirming estimates of economic damage for use in connection with a cost-benefit analysis of air pollution control efforts. The report was undertaken for the purpose of generating information useful to the government in estimating the economic effects of air pollution.

PB-245 756/2GA PC$3.75/MF$2.25
Public Health Service, Atlanta, Ga. Div. of Water Supply and Pollution Control.
Pesticide Pollution Studies.
Progress rept. 1959-63.
Mar 63, 30p

Descriptors: *Water pollution, *Pesticides, Benthos, Sampling, Concentration(Composition), Plankton, DDT, Endrin, Dieldrin, Insecticides, Agriculture, Soils, Rainfall, Tables(Data), Field tests.
Identifiers: *Water quality data, Path of pollutants.

The progress report covers the period from the inception of the Pesticide Pollution Project in 1959 through February 1963. The purpose of the project is to determine if pesticides used in normal pursuits of man find their way into the water environment. Individual projects are described as well as the general methodology used in all projects.

PB-245 765/3GA PC$5.75/MF$2.25
North Carolina Water Resources Research Inst., Raleigh.
Strategies for Water Quality Monitoring,
Jabbar K. Sherwani, and David H. Moreau. Jun 75, 150p* UNC-WRRI-75-107 W76-00178, OWRT-A-065-NC(2)
Contract DI-14-31-0001-4033
Also pub. as North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering, Rept. no. ESE-Pub-398.

Descriptors: *Stream pollution, *Monitoring, *Water quality, Networks, Design criteria, Concentration(Composition), Water flow, Sampling, Site selection, Trends, Mathematical models, Spatial distribution, Estimating, Surface water runoff, Variance(Statistics), Statistical quality control, Field tests, North Carolina, Management planning.
Identifiers: Water pollution standards, Storm water runoff, *Water pollution sampling, Data collection.

General guidelines are provided for the preliminary design of a water quality monitoring system. The design is defined as the specification of the parameters to be determined, the number and location of sampling stations, and the frequency of sampling. The role of several objectives in the determination of monitoring strategy is considered. The objectives are the characterization of stream water quality, enforcement of stream standards and the detection of long-term trends. Principal component analysis is used to identify important water quality parameters and to find the appropriate size of a monitoring network. Information content defined as the reciprocal of the variance of the estimate of the mean concentration is suggested as a valid criterion for the design of a monitoring network for the characterization of water quality. Impact index based on the probability, severity and frequency of violation, number of direct users of the stream water, predominant use and the size of stream is proposed for determining the priority of location in an enforcement network. A protocol for the sampling of non-point sources is presented. The Research Triangle area in North Carolina is used as a case study. A possible framework for the strategy of water quality monitoring is described.

PB-245 773/7GA PC$4.25/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
Liberty Reservoir, Carroll and Baltimore Counties, Maryland.
Final rept.
Jun 75, 55p Working Paper-357
Prepared in cooperation with National Environmental Research Center, Corvallis, Oreg., Maryland Dept. of Health and Mental Hygiene, Baltimore, Maryland Dept. of Natural Resources, Annapolis, and Maryland National Guard, Annapolis.

Descriptors: *Water pollution, *Liberty reservoir, Surveys, Inorganic phosphates, Inorganic nitrates, Bioassay, Primary biological productivity, Chemical properties, Water quality, Drainage, Nutrients, Sources, Tables(Data), Maryland.
Identifiers: Eutrophication, *Water quality data, Carroll County(Maryland), Baltimore County(Maryland).

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

PB-245 809/9GA PC$7.00/MF$2.25
De Leuw, Cather/STV, Washington, D.C.
Characteristics of Urban Transportation Systems. A Handbook for Transportation Planners.
May 75, 193p* UMTA-IT-06-0049-75-1
Supersedes PB-233 580. Prepared in cooperation with Urban Inst., Washington, D.C.

Descriptors: *Urban transportation, *Handbooks, Rail transportation, Buses(Vehicles), Automobiles, Pedestrians, Passageways, Operating costs, Pollution, Energy consumption, Accidents, Tables(Data).
Identifiers: People movers, Modal split.

The objective of the handbook specifically for use by transportation planners in the evaluation of alternative systems, is to provide a single simplified reference source which characterizes the most important (from the standpoint of evaluation) performance characteristics of the following contemporary urban transportation systems: (1) Rail (commuter, rapid, and light); (2) local bus and bus rapid transit; (3) automobile-highway system (automobiles and other vehicles); (4) pedestrian assistance systems; and (5) activity center systems---people mover systems that have been installed at airports, zoos, amusement parks, etc. The handbook assesses the supply or performance aspect of urban transportation dealing with passenger demand implicitly. Seven supply parameters studied are: speed, capacity (service volume), operating cost (vehicle), energy consumption (vehicle or source), pollution, capital cost, and accident frequency.

PB-245 817/2GA PC$5.75/MF$2.25
Environmental Protection Agency, Washington, D.C.
The Economics of Clean Water - 1973.
Dec 73, 128p
Previously announced as N74-33866.

Descriptors: *Water quality, *Water pollution abatement, *Economic impact, Costs, Municipalities, Industrial wastes, Benefit cost analysis, Constraints, Cost comparison, Policies, Sewage treatment.
Identifiers: *Water pollution economics.

The report is the sixth in the series of Clean Water Reports to Congress. The scope of the 1973 report is broader than previous reports because the EPA recognizes that consideration of the cost of controlling pollution from municipal and industrial sources is not sufficient information upon which to evaluate a national program. It primarily focuses on the economic factors that will influence implementation of the 1972 amendments but also deals with the nature of the water quality problem, costs of controlling significant sources of pollution, potential benefits, and administrative factors.

PB-245 822/2GA PC$3.75/MF$2.25
Boston Urban Observatory, Mass.
The City, the Developer and the Citizen: Downtown Boston Faces the Hi-Rise.
Final rept.,
David R. Barrett. Jan 75, 41p UO-LCCM-BOS-75-011
Contract HUD-H-987

Descriptors: *Urban planning, *Control city, Urban development, Citizen participation, Public buildings, Office buildings, Massachusetts.
Identifiers: Boston(Massachusetts), High rise buildings.

The report surveys the changing factors that establish the context for private development and its control in downtown Boston, and introduces one of the alternatives available for providing guidance and control. Rather than recommend a solution to the many problems involved in downtown development, it attempts to define the context for development and provide sufficient information on current conditions in order to encourage participation by all interested parties in the decision-making process.

PB-245 835/4GA PC$8.75/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Tunnel Model: Users' Manual.
Technical rept. no. 6, Apr 74-Jun 75,
Saturnino Suarez Reynoso, and David J. Gray. Jun 75, 287p R75-29 NSF/RA/T-75/022
Grant NSF-GI-34029
See also report dated Jul 74, PB-243 253.

Descriptors: *Rocks, *Tunneling(Excavation), *Cost estimates, Construction costs, Cost analysis, Geological surveys, Construction equipment, Tunneling machines, Computerized simulation, User needs, Computer programs.
Identifiers: *File structures, *Data files.

This User's Manual provides the guidelines required to implement the Tunnel Cost Model (TCM) and its file structure, to prepare input data, and to operate the system. It also aids in identifying several interrelationships among data structures and program flow that affect the TCM results.

PB-245 843/8GA PC$4.25/MF$2.25
Bureau of Mines, Denver, Colo. Intermountain Field Operation Center.
Strip-Mining Techniques to Minimize Environmental Damage in the Upper Missouri River Basin States.
Information circular 1975,
Franklin H. Persse. Sep 75, 58p BuMines-IC-8685

Descriptors: *Strip mining, *Land reclamation, *Missouri River Basin, *Environmental surveys, *Coal mining, Spoil, Land use, Vegetation, Fertilizing, Planting, Air pollution, Water pollution, Montana, North Dakota, Wyoming, Cost estimates, Lignite.
Identifiers: Upper Missouri River Basin, Environmental protection.

To meet escalating energy requirements, substantial increases in production from strippable coal and lignite deposits in eastern Montana, western North Dakota, and northeastern Wyoming already have occurred, and further expansions are expected to continue at least until the year 2000. Such production, attributable largely to rising demand for low-sulfur coal, must be accomplished with a minimum of adverse effects on the environment. Information on geology, climate, and current land use in the Upper Missouri River basin is presented as a guideline to what operators expect during, and after mining. Proven methods of protecting the air and water from pollution and of restoring mined land for other uses are described by the Bureau of Mines. In addition, untried methods of land reclamation, some with equipment yet to be manufactured are discussed as means of maintaining high aesthetic values in the basin. Costs incurred to protect the environment are legitimate part of the production cost and must be born by the ultimate consumer. Unit production costs are less for the thick coal and lignite deposits of the basin than for the thinner but higher Btu coal deposits of the eastern and midwestern United States.

PB-245 845/3GA PC$4.25/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
Loch Raven Reservoir, Baltimore County, Maryland.
Final rept.
Jun 75, 55p Working Paper-358
Prepared in cooperation with National Environmental Research Center, Corvallis, Oreg., Maryland Dept. of Health and Mental Hygiene, Baltimore, Maryland Dept. of Natural Resources, Annapolis, and Maryland National Guard, Annapolis.

Descriptors: *Water pollution, *Lock Raven Reservoir, Surveys, Inorganic phosphates, Inorganic nitrates, Bioassay, Primary biological productivity, Chemical properties, Water quality, Drainage, Nutrients, Sources, Tables(Data), Maryland.
Identifiers: Eutrophication, *Water quality data, Baltimore County(Maryland).

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

PB-245 846/1GA PC$3.75/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
Deep Creek Lake, Garrett County, Maryland.
Final rept.
Jun 75, 49p Working Paper-355
Prepared in cooperation with National Environmental Research Center, Corvallis, Oreg., Maryland Dept. of Health and Mental Hygiene, Baltimore, Maryland Dept. of Natural Resources, Annapolis, and Maryland National Guard.

Descriptors: *Water pollution, *Deep Creek Lake, Surveys, Inorganic phosphates, Inorganic nitrates, Bioassay, Primary biological productivity, Chemical properties, Water quality, Drainage, Nutrients, Sources, Tables(Data), Maryland.
Identifiers: Eutrophication, *Water quality data, Garrett County(Maryland).

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included.

PB-245 854/5GA PC$10.00/MF$2.25
Biospherics, Inc., Rockville, Md.
Contributions of Urban Roadway Usage to Water Pollution.
Final rept. Apr 72-Sep 74,
Donald G. Shaheen. Mar 75, 359p EPA/600/2-75-004
Contract EPA-68-01-0197

Descriptors: *Surface water runoff, *Urban areas, *Water pollution, *Roads, Motor vehicles, Elastomers, Greases, Asbestos, Toxicity, Vehicular traffic, Petroleum products, Metals, Nutrients, District of Columbia, Maryland, Virginia, Metropolitan areas, Sources.
Identifiers: *Storm water runoff, Heavy metals.

Street surface contaminants are deposited on roadways from many sources within an urban area. Industrial operations, land use activities, fallout of air pollutants, roadway usage and other activities contribute to the loading of particulates on urban roadways. These materials are then carried into receiving waters by storm runoff where they constitute a substantial portion of the overall water pollution problems of cities. Metropolitan Washington, D.C., with its low background of industrial emissions, was the area chosen for study of contributions of motor vehicle usage to urban roadway loading factors. Specific roadway study sites within this area were selected so as to provide minimal interference from nontraffic-related land use activities and thus isolate, as much as possible, the traffic-related depositions.

PB-245 893/3GA PC$3.75/MF$2.25
Reading, Pa. USAC Project.
The Small City and Integrated Municipal Information Systems.
Completion rept.
May 75, 36p* USAC-RPA1-1199
Contract H-1212

Descriptors: *Local government, *Urban information systems, *Data processing, Urban development, Systems analysis, Systems engineering, Modules, Computer programming, Services, Classifications, Pennsylvania.
Identifiers: USAC project, *Reading(Pennsylvania), Integrated municipal information systems.

This report is from a series produced by the city of Reading covering activities from systems analysis through implementation and evaluation of urban information systems. This document signals completion of the development phase of the USAC project. It contains a description of the methodology used by Reading during its development. Section one of this document very briefly defines the small city and its data needs. Section two details the components of the Reading Integrated Municipal Information System. Section three discusses the Reading Data Base and the Data Management Technique. Section four provides a guide for future IMIS development.

PB-245 894/1GA PC$3.75/MF$2.25
Charlotte, N.C. USAC Project.
Charlotte USAC Project: The Task 3 Completion Report.
Final task completion rept.
Jul 75, 35p USAC-CNCO-0201, MIS-3401/000/00
Contract H-1216

Descriptors: *Local government, *Urban information systems, *Public administration, North Carolina, Computer programming, Vehicular traffic control, Sanitary engineering, Data processing, Modules, Fire departments, Equipment, Management methods, Relocation, Police, Personnel management, Buildings, Licenses, Specifications.
Identifiers: USAC project, *Charlotte(North Carolia), Sanitary landfills, Geographic base files, Building permits.

The report is from a USAC series produced by the city of Charlotte, covering activities from systems analysis through implementation and evaluation of urban information systems. The Task 3 Completion Report on designated public services provides a listing of all deliverable documentation associated with the Task 3 design effort. It also contains a brief description of each module designed and the data acquisition plan for each file that supports the module design.

PB-245 895/8GA PC$5.75/MF$2.25
Charlotte, N.C. USAC Project.
Charlotte USAC Project: Code Enforcement Module Computer Program Descriptions.
Initial task completion rept.
Jul 75, 145p* USAC-CNCO-0199, MIS-4302/017/01
Contract H-1216

Descriptors: *Local government, *Urban information systems, *Data processing, *Computer programming, Modules, North Carolina, Specifications, Residential buildings, Building codes, Law enforcement, Evaluation, Recording, Reporting, State government, Regulations.
Identifiers: USAC project, *Charlotte(North Carolina), Housing codes, Violations, Code enforcement, State regulations, Integrated municipal information systems.

The report is from a USAC series produced by the City of Charlotte. The Module Computer Program Description document provides detailed technical information on the design, development and verification testing of the IMIS module computer program package. The document describes the entire computer program set for the Code Enforcement Module within the Charlotte IMIS system. Information is provided in sufficient detail to accommodate the transfer of responsibility for program adaption, error checking, and modification from the original program developers to other parties.

PB-245 956/8GA PC$5.25/MF$2.25
Bechtel, Inc., Gaithersburg, Md.
Northeast Corridor High Speed Rail Passenger Service Improvement Project. Task 4A. Signaling and Communications.
Final rept.,
John Williams, and George Pipas. Sep 75, 110p FRA/ONECD-75/4A
Contract DOT-FR-40027
See also report dated Apr 75, PB-243 419.

Descriptors: *Rapid transit railways, *Passenger transportation, *Northeast Region(United States), Planning, Railroad signals, Cost estimates, District of Columbia, Massachusetts, Circuits, Railroad tracks, Control equipment, Installation, Specifications.
Identifiers: DOT/2C, DOT/1B, Commuter rail systems.

The report includes description of the present signal systems, recommendations and description of the changes required to support high-speed passenger service, and corresponding cost estimates for the Northeast Corridor (Washington, D.C. to Boston, Massachusetts). Recommendations and descriptions cover the areas of proposed signal systems, track circuit requirements, impedance bonds, hazard protection devices, control systems, communications systems, training devices, installation schedule, and estimates of costs to procure and install such systems. Typical construction and installation specifications are included as an appendix.

PB-246 105/1GA PC$4.75/MF$2.25
Minnesota Univ., Minneapolis. Water Resources Research Center.
Annual Report of Water Resources Research Center (11th).
Jul 75, 85p WRRC-Bull-82 W76-00378, OWRT-A-999-MINN(37)
Contract DI-14-31-0001-5023

Descriptors: *Water resources, *Regional planning, *Water pollution abatement, Projects, Reviewing, Water quality management, Environments, Research, Rainfall, Snowmelt, Algae, Lakes, Thermal pollution, Forecasting, Social effect, Remote sensing, Evaluation, Forestry, Minnesota.
Identifiers: Eutrophication.

A report is made on the 1975 budget, twelve research projects, and Center personnel. The projects involved Minnesota water resources research, water supply quality, and pollution; precipitation variation, rainfall and snowmelt forecasting in Minnesota; biomanipulation of lakes for eliminating algae; thermal pollution and trophic level fauna in Lake Superior; social dimensions and trends in Minnesota water quality status; remote sensing; hydronomic analysis of forest management alternatives; and pollution indexes.

PB-246 133/3GA PC$5.25/MF$2.25
Real Estate Research Corp., Washington, D.C.
Urban Renewal Land Disposition Study, Sacramento, California.
Interim rept.,
Thomas J. Harrison, and Robert Ginsburg. Jun 74, 115p
Contract HUD-H-3610

Descriptors: *Urban renewal, *Urban planning, Public buildings, Roads, Central City, Construction, Socioeconomic status, California.
Identifiers: Sacramento(California).

A case study is presented of urban renewal in Sacramento with special emphasis on four projects: Capitol Mall, Capitol Mall Extension, Capitol Mall Riverfront, and Oil Paso Heights. Consideration of these projects is preceded by a summary overview of local socioeconomic characteristics, institutional framework, and planning and renewal strategy. Each project is described both chronologically--in terms of important events in project planning and execution--and analytically. Major factors impacting on land disposition for the entire program are discussed.

TT-70-57210/4 PC$5.75/MF$2.25
Air Pollution Technical Information Center, Research Triangle Park, N.C.
Air Purification. Volume 8, Number 4, October 1970.
1975, 149p
Trans. of Kuki Seijo (Japan) v8 n4 Oct 70. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Air pollution control, *Surveys, Plant location, Industrial plants, United States, Translations, Japan.

Contents: List of the members of the Mission for studying contamination control and clean room in America; Travel schedule of the Mission; A brief sketch of the centers visited; John F. Kennedy Space Center, Oak Ridge National Laboratory, American Air Filter Company Inc., UNIVAC Western Computer Center, Sandia Laboratories, Boeing Company, Space Company, American Association for Contamination Control; Sum up; List of documents collected by the Mission; Photographs.

TT-74-54053/1 PC$4.75
Environmental Protection Agency, Washington, D.C.
Air Conservation. Volume 8, Number 1(39), 1974.
1975, 84p
Unedited trans. of Ochrona Powietrza (Poland) v8 n1(39) 1974, by Andrzej Skup. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Air pollution, *Periodicals, Health, Weather, Iron and steel industry, Flue gases, Particles, Concrete plants, Tobacco, Activated carbon, Fuels, Sulfur dioxide, Ecology, Environmental impacts, Translations, Poland.
Identifiers: Air pollution effect(Humans), Cigarette filters.

Contents: Ecological aspects of a suggested change in the structure of national fuel-energy balance; Epidemiologic studies on the air pollution effect on health of the population; The effect of meteorological conditions on the pollutants concentration in the atmosphere in the Cracow ironworks area; Characteristics of the air pollution with specific emissions released by industrial plants; Air pollution from the SOKP-25 paving plants particulate emissions; Activated carbons for filters of some cigarette brands; Patent review; News in brief; Review of papers; Miscellaneous.

TT-74-54053/2 PC$4.75
Environmental Protection Agency, Washington, D.C.
Air Conservation. Volume 8, Number 2(40), 1974.
1975, 81p
Unedited trans. of Ochrona Powietrza (Poland) v8 n2(40) 1974, by Andrzej Skup. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Air pollution, *Periodicals, Air pollution control, Flue dust, Gas sampling, Sulfur dioxide, Iron and steelmaking, Odors, Nitrogen oxides, Nitric acid, Separators, Air pollution control equipment, Translations, Poland.
Identifiers: Air pollution sampling.

Contents: Techniques of measurements of dust concentration in gas ducts; Sulfur dioxide conversion in the atmospheric air in the Cracow Ironworks Region; Odors and the air pollution control; Dust particle path in the vortical stream of an axial vortex-flow dust separator; Nitrogen oxides determination in waste gases from the nitric acid manufacture; Industrial briefs; News in brief; Review of papers; Announcements.

13C. Construction Equipment Materials, and Supplies

AD-A016 355/0GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Control of Reactive Carbonate Rocks in Concrete.
Final rept.,
Alan D. Buck. Sep 75, 76p Rept no. AEWES-TR-C-75-3

Descriptors: *Concrete, *Carbonate minerals, *Rock, Chemical reactions, Laboratory tests, Strength(Mechanics), Compressive properties, Test methods, Tensile properties.
Identifiers: Aggregates, Alkali aggregate reactions.

The effects of using reactive carbonate rocks as concrete aggregates were evaluated in a laboratory investigation. Three reactive carbonate rocks, each producing a different manifestation of the alkali-carbonate rock reaction in concrete, were each used at three dilution levels, one with low-alkali and two with high-alkali portland cements, to make concrete specimens that were tested for length changes for 3 yr in a moist environment, and for compressive and tensile strengths to 1 yr. Limited testing for compressive strength was extended to 3 yr. A carbonate rock and a granite gneiss were also used as coarse aggregates in other concrete mixtures to serve as controls. The detection procedure and control criteria of Appendix C of the Standard Practice for Concrete for potentially reactive carbonate rocks intended for use as concrete aggregates were considered for validity in view of the laboratory results. The test data indicate that the numerical values used in Appendix C are satisfactory without change. It is recommended that Appendix C be modified to permit optional testing of potentially reactive rocks in concrete when this seems desirable.

AD-A016 914/4GA PC$5.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Studies of Excavating Equipment,
I. G. Basov. Oct 75, 104p Rept no. CRREL-TL-489
Draft trans. of mono. Issledovaniya Zemleroinykh Mashin, Tomsk, 1973 104p.

Descriptors: *Earth handling equipment, Freezing, Soils, Cutters, Cranes, Shovels, Translations, USSR, Cold weather operations, Excavation.
Identifiers: *Excavating equipment, Frozen soils.

This book presents studies on various types of excavating equipment. The emphasis is on equipment especially successful in excavating frozen ground. There are seventeen separate studies.

COM-75-11400/9GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Applied Technology.
Waterproofing Materials for Masonry.
Final rept. Jan 74-Jan 75,
Elizabeth J. Clark, Paul G. Campbell, and Geoffrey Frohnsdorff. Oct 75, 89p* NBS-TN-883
Sponsored in part by Department of Housing and Urban Development, Washington, D.C. Policy Development and Research.

Descriptors: *Masonry, *Waterproofing, Performance evaluation, Laboratory tests, Weathering, Accelerated tests, Water vapor, Efflorescence, Durability, Criteria.

The initial effectiveness and durability characteristics of fifty-five clear masonry waterproofing materials were evaluated using laboratory tests. This report contains the results of initial performance tests including water absorption, water vapor transmission, resistance to efflorescence and change in appearance. Durability tests, including periodic measurement of water absorption after exposures to accelerated weathering and outdoor exposures, were also conducted. Based on test results, performance criteria for clear waterproofing materials were developed. In addition, recommendations for the application of waterproofing materials were formulated. Finally, the report contains a summary of a survey concerning field experiences with waterproofing and a brief theoretical discussion of water flow.

PB-245 648/1GA PC$5.25/MF$2.25
West Virginia Dept. of Highways, Charleston.
Application of Nondestructive Testing Techniques for Evaluation of the Engineering Properties of Portland Cement Concrete. Volume 1.
Final rept.,
Roger K. Seals, and David A. Anderson. Jan 75, 106p WVDOH-37-2-Vol-1

See also Volume 2, PB-245 648. Prepared in cooperation with West Virginia Univ., Morgantown. Dept. of Civil Engineering.

Descriptors: *Nondestructive tests, *Portland cements, *Concretes, Aggregates, Water, Formulations, Compressive strength, Predictions, Vibration, Concrete durability, Strength.
Identifiers: DOT/4BZ/BC.

The principal goals of the Phase I and Phase II studies were, respectively: (1) to establish the validity of predicting strength from nondestructive measurements and to select an optimum combination of sample configuration - test method - sample preparation technique for use in Phase II and III (2) to study the effects of aggregate type, water:cement ratio, and cement factor on the prediction of long term strength from early-time pulse velocity measurements.

PB-245 649/9GA PC$5.75/MF$2.25
West Virginia Dept. of Highways, Charleston.
Application of Nondestructive Testing Techniques for Evaluation of the Engineering Properties of Portland Cement Concrete. Volume 2 (Appendices).
Final rept.,
Roger K. Seals, and David A. Anderson. Jan 75, 140p WVDOH-37-2-Vol-2
See also Volume 1, PB-245 648. Prepared in cooperation with West Virginia Univ., Morgantown. Dept. of Civil Engineering.

Descriptors: *Portland cements, *Concretes, *Nondestructive tests, Aggregates, Water, Formulations, Compressive strength, Vibration, Strength, Predictions, Tables(Data), Graphs(Charts).
Identifiers: DOT/4BZ/BC.

The principal goals of the Phase I and Phase II studies were, respectively: (1) to establish the validity of predicting strength from nondestructive measurements and to select an optimum combination of sample configuration - test method - sample preparation technique for use in Phase II and III (2) to study the effects of aggregate type, water:cement ratio, and cement factor on the prediction of long term strength from early time pulse velocity measurements. A recommended Phase III work plan is presented in Appendix B (Volume II).

PB-245 650/7GA PC$5.25/MF$2.25
Purdue Univ., Lafayette, Ind. Joint Highway Research Project.
Shale Classification Tests and Systems: A Comparative Study.
Interim rept., Phase I,
David R. Chapman. Jun 75, 103p* JHRP-75-11
Prepared in cooperation with Indiana State Highway Commission, Indianapolis.

Descriptors: *Shales, *Embankments, Classification, Design, Laboratory tests, Durability, Atterberg limits, Abrasion tests, Hardness, Degradation, Slaking, X ray diffraction, Regression analysis, Aggregates, Concrete pavements, Soils, Highways.
Identifiers: DOT/4BZ/BA.

The abundance of shale rock necessitates its economical and efficient use in compacted embankments. Differing shale durabilities require a variety of design parameters and construction techniques. Classification systems for shales are available, and are helpful, but most have not been definitively correlated with field performance of compacted shales. Simple laboratory tests were selected from several existing classification systems, and performed on six Indiana shales. Tests included: Slake Durability, slaking tests with different slaking fluids, Atterberg limits, Los Angeles Abrasion, Schmidt Hammer hardness, and the Washington Degradation test. Also included was a study of sample preparation effects on Atterberg limits results. The shales were then classified by each system, and the descriptive categories for the various systems were compared. Regression analysis was used to examine statistical relationships among results from different tests. X-ray diffraction patterns and soil chemistry procedures were used to identify constituent minerals and their relative percentages.

13E. Couplings, Fittings, Fasteners, and Joints

AD-A016 288/3GA PC$4.25/MF$2.25
Materials Research Lab Inc Glenwood Ill
Fracturing Characteristics of Adhesive Joints.
Final rept. 31 Jan 74-15 Jan 75,
Sheldon Mostovoy, and E. J. Ripling. Sep 75, 51p
Contract N00019-74-C-0274

Descriptors: *Bonded joints, Crack propagation, Fracture(Mechanics), Fatigue(Mechanics), Adhesives, Epoxy resins, Temperature.

In the first section, the dependence of crack velocity on crack extension force, G, over a range of G values from approximately 0.5 to 5.0 lb/in. is discussed. In the second section the 300F curing epoxy, MRL-3, is shown to be independent of cyclic frequency over the range from 0.67 to 180 cpm in both laboratory air and liquid water. At room temperature the adhesive is shown to be more resistant to fatigue crack extension in water than in ambient humidity. At elevated temperatures the crack growth rate is much faster than it is at room temperature and the adhesive becomes frequency dependent. Section 3 compares the fracture toughness of a number of adhesives with the fatigue threshold value and the stress corrosion cracking threshold G as a function of testing temperature.

AD-A016 809/6GA PC$3.75/MF$2.25
Naval Air Development Center Warminster Pa Air Vehicle Technology Dept
Evaluation of Sermetel W Coating for Fasteners.
Progress rept.,
M. J. Zurko. 11 Jul 75, 39p Rept no. NADC-75121-30

Descriptors: *Fastenings, *Aluminum coatings, Assessment, Titanium alloys, Stresses, Heat resistant materials, Environmental tests, Naval aircraft.
Identifiers: Alodine-407-47.

The evaluated coating SermeTel W with Alodine 407-47 conversion coating is intended for use on titanium fasteners, fasteners in titanium structures and alloy steel fasteners in temperature environments beyond cadmium coating capabilities. The cadmium coating is not acceptable for titanium application since titanium fasteners or titanium structures in contact with cadmium are susceptible to cracking when highly stressed even at temperatures well below 450 F. The investigation in this report included reusability (locking torques), torque-tension relationship, tension-tension fatigue, salt spray, coating thickness and coating continuity. The test results of samples coated with SermeTel W were compared with cadmium coated samples and were found to be suitable for alloy steel fasteners which are in contact with titanium structures or are exposed to temperatures above 450 F.

13F. Ground Transportation Equipment

AD-A016 911/0GA PC$3.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Effects of Variation in Drawbar Hitch Location on Vehicle Performance.
Special rept.,
Ben Hanamoto. Sep 75, 19p Rept no. CRREL-SR-237

Descriptors: *Ground vehicles, *Tow bars, *Soil dynamics, Vehicle wheels, Sinking, Sliding, Interactions, Mobility, Trafficability.
Identifiers: *Soil wheel interactions.

The drawbar hitch point location has a direct effect on the trim attitude of a vehicle and also influences the net pull developed by a vehicle during a drawbar pull test. These results have indicated an area of study needing expansion: the relationship of sinkage and slip. Slip-sinkage is a factor which cannot be neglected in the analytical evaluation of vehicle performance. The equations relating sinkage, resistance, trim angle and the traction require further development. One procedural modification that could be made when a drawbar pull test was being conducted to obtain validation data would be to locate the tow hitch point at ground level, eliminating the trim attitude caused by the rearward shift of the center of pressure beneath the contact area.

AD-A016 923/5GA PC$4.25/MF$2.25
Army Tank-Automotive Command Warren Mich
A Study of Roadwheel Failures Magnitude - Nature - Causes and Testing of a Concept to Prevent Them.
Final technical rept. Apr 72-Jul 75,
John W. Cameron. Jul 75, 58p Rept no. TACOM-TR-12080

Descriptors: *Roadwheels, *Tracked vehicles, *Failure(Mechanics), Mechanical engineering, Performance(Engineering), Destructive tests, Test methods, Countermeasures, Idler wheels, Materials, Modification, Mechanical properties, Tanks(Combat vehicles), Army research, Tires, Photographs.
Identifiers: Failure analysis, Alternatives, Recommendations.

This is a study of raodwheel failures - magnitude - nature - causes, and of a concept to overcome these failures so that the life and reliability may be improved and thus, the availability of tracked vehicles may be improved to reduce fleet costs.

COM-75-50545/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Tire-Road Interaction Noise.
Final rept.,
William A. Leasure, Jr., and Erich K. Bender. Jul 75, 12p
Pub. in Jnl. of the Acoustical Society of America, v58 n1 p39-50 Jul 75.

Descriptors: *Tires, *Noise(Sound), Treads, Acoustic properties, Structural design, Vehicles, Theories, Research.
Identifiers: *Tire pavement interactions, Tire noise, Reprints.

The relative importance of tire noise to overall vehicle noise is established. A general description is then given of the tire engineering process and of tire structures. The important parameters influencing tire noise are discussed, based on presently available data, followed by an identification of unknown and contradictory areas. The basic mechanisms of tire-noise generation, although not well understood, are investigated largely from a theoretical viewpoint. Areas for future research and development are identified based on gaps in the existing physical data base and a rather primitive level of understanding of noise-generating mechanisms.

NTIS/PS-75/787/2GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Bicycle Safety and Transportation (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
Carolyn Shonyo. Oct 75, 58p*
Supersedes NTIS/PS-75/074.

Descriptors: *Bibliographies, *Bicycles, Traffic safety, Pedestrians, Exercise(Physiology), Safety, Accidents, Recreation, Urban transportation.
Identifiers: Bikeways, Pedestrian safety.

The bibliography contains citations to research reports concerned principally with bicycle safety and accidents. Other areas covered include bikeways, traffic laws as related to bicycles, and physiological effects of using bicycles for exercise. (Contains 53 abstracts)

N75-31010/2GA PC$4.25/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Experimental Aerodynamic Characteristics of Vehicles Traveling in Tubes.
D. W. Kurtz, and B. Dayman, Jr.. 15 Jul 75, 69p
NASA-CR-143490, JPL-TM-33-731
Contract NAS7-100

Descriptors: *Aerodynamic characteristics, *Rail transportation, *Rapid transit systems, Fluid mechanics, Funnels, Heat transfer, Incompressible flow, Scaling laws, Urban planning.

For abstract, see STAR 1322

PAT-APPL-491 983/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Train Resonant Car-Body Rocking Detector System.
Patent Application,
Frank H. Swaim. Filed 25 Jul 74, 15p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Railroad cars, *Derailment, Patents, Prevention, Hydraulic actuators, Braking, Detectors, Piezoelectric materials, Deceleration.
Identifiers: *Patent applications, PAT-CL-246-169, Resonant rocking.

A significant number of freight cars have a relatively high center of gravity and a truck center distance close to the 39-foot standard rail joint spacing. When operated near the resulting resonant speed of 18 to 20 mph on a curved track, such cars may derail. A hydraulic sensor is described in the patent application which detects and registers the resonant rocking motion of a train car and activates the brake system to stop the train prior to possible derailment due to wheel rock-off from the track.

PB-245 263/9GA PC$5.75/MF$2.25
Dyer (Thomas K.), Inc., Lexington, Mass.
Trackage Rights Study.
Aug 75, 127p USRA/R-126
Contract USRA-50095

Descriptors: *Railroad tracks, *Joint operation, *Economic analysis, Maintenance, Cost engineering, Agreements, Railroads, Contract administration, Operating costs, Return on investment.
Identifiers: Trackage rights.

The objective of this study is to better quantify the economics of trackage rights agreements (TRA's) and to structure negotiated contracts which are equitable and fair. Maintenance-of-way costs and operating cost factors such as traffic densities and train delays are discussed. Alternative methods for developing TRA costs are given. Eleven current representative trackage rights agreements were reviewed. The major elements of these TRA's are summarized in a table. A pre-negotiation check list of factors for owner and tenant is developed. Models for TRA's for commuter and freight territory are included.

PB-245 310/8GA PC$5.25/MF$2.25
Boeing Vertol Co., Philadelphia, Pa. Surface Transportation Systems Dept.
Urban Rapid Rail Vehicle and Systems Program.
Annual rept. Jul 73-Jul 74.
Jul 74, 125p D174-10033-1 UMTA-IT-06-0026-74-13
Contract DOT-UT-10007
See also PB-224 141.

Descriptors: *Rapid transit railways, *Urban transportation, Research, Railroad cars, Design, Automatic control, Tests, Braking.
Identifiers: SOAC(State of the Art Cars), State of the art cars, Commuter rail systems, DOT/2C, DOT/1A.

The report reviews the third year's efforts of the Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program. The objective of the Program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe and economical as possible. Accomplishments for the year ending June 1974 included the following: Completion of the review of BART data; completion of the SOAC test and simulated demonstration programs at the High Speed Ground Test Center, Pueblo, Colorado after repairing the damage to the SOAC cars resulting from a collision with a standing car on August 11, 1973; completion of SOAC demonstration runs on the NYCTA lines.

PB-245 414/8GA PC$5.75/MF$2.25
Bechtel, Inc., Gaithersburg, Md.
Northeast Corridor High Speed Rail Passenger Service Improvement Project. Task 11S. Improvement Plan for Physical Plants With Estimated Costs. Volume II.
Final rept.,
H. Sutcliff, W. Bailey, D. J. Biss, L. A. Irvin, and F. M. Livingston. Jul 75, 135p FRA-ONECD-75-11S
Contract DOT-FR-40027
See also PB-244 873.

Descriptors: *Rapid transit railways, *Passenger transportation, *Northeast Region(United States), *Planning, Railroad tracks, Bridges, Tunnels, Telecommunication, District of Columbia, Connecticut.
Identifiers: New Haven(Connecticut), DOT/1B, DOT/3B, Commuter rail systems.

The two-volume report describes the physical plant necessary to meet trip time goals and permit high speed train operations in the section of the Northeast Corridor between Washington, D. C. and New Haven, Connecticut. The cost of the physical improvements are estimated and an implementation schedule is presented in Volume I. Facilities include track, bridges, tunnels, signals, communications, electrification and other items. Volume 2 includes track charts and aerial photographs of major curve realignments and interline connections on the Northeast Corridor, and a graphical representation of simulated train performance.

PB-245 569/9GA PC$4.75/MF$2.25
Bureau of Social Science Research, Inc., Washington, D.C.
Attitudes Toward Metrorail in the Washington Area.
Attitudes study, Feb-Apr 75.
Jun 75, 85p BSSR-717
Also pub. as Washington Metropolitan Area Transit Authority, D.C. WMATA-75/26. Prepared in cooperation with Federal City Council, Washington, D.C.

Descriptors: *Mass transportation, *Rail transportation, *Attitude surveys, Urban transportation, Public opinion, Interviews, Passenger transportation, Opinions, Predictions, Financing, Travel, Metropolitan areas, District of Columbia, Maryland, Virginia.
Identifiers: Washington Metro system, Metropolitan Washington transit system, Ridership, Commuting.

This report includes the major findings of a study carried out in late winter and early spring of 1975 to assess public attitudes in the Washington area toward the Metrorail system in various stages of its construction in different parts of the community. The study used standard survey research techniques in which samples of the population were interviewed about their transportation habits, their priorities for improvements in local transportation, their views about Metrorail and aspects of its operation, their own prediction about the likelihood of their using the system and their opinions about methods of financing Metro's construction. The interviewing was carried out by the field staff of The Washington Survey, the local research facility of BSSR.

PB-245 596/2GA PC$6.25/MF$2.25
Ultrasystems, Inc., Phoenix, Ariz. Dynamic Science Div.
Accident Avoidance Test Report-Nissan and Toyota Experimental Safety Vehicles.
Final rept. Apr 74-Jul 75,
P. Boulay, and T. Macaulay. Sep 75, 153p
Dynamic Science-2310-75-116 DOT-HS-801 713
Contract DOT-HS-4-00860

Descriptors: *Automobiles, *Accident prevention, *Safety engineering, Dynamic tests, Safe handling, Braking, Steering, Design standards.
Identifiers: Experimental safety vehicles, Toyota Motor Company, Nissan Motor Company, Toyota automobiles, Nissan automobiles, DOT/5A, DOT/4DZ/DB.

Two Experimental Safety Vehicles (ESVs) manufactured by Nissan and Toyota of Japan were tested to evaluate the accident avoidance performance of each vehicle. The report contains a brief description of each vehicle and of each test performed as well as the results of the tests. The tests performed included: Braking performance -stopping distance, pedal force, emergency braking, brake efficiency, and parking brake tests; steering performance -transient and steady state yaw response; handling - lateral acceleration, sinusoidal steer, and trapezoidal steer tests; overturning immunity - drastic steer and brake tests. Each of the above results are presented and compared to the Japanese ESV design requirements.

PB-245 608/5GA PC$7 50/MF$2.25
Purdue Univ., Lafayette, Ind. Joint Highway Research Project.
Analysis of Driver Reaction to Warning Devices at a High-Accident Rural Grade Crossing.
Final rept.,
Eugene R. Russell. Aug 74, 233p JHRP-74-16
Prepared in cooperation with Indiana State Highway Commission, Indianapolis.

Descriptors: *Railroads, *Highways, *Intersections, *Warning systems, Flashlight, Gates(Circuits), Signal devices, Vehicular traffic, Traffic safety, Visibility, Traffic surveys.
Identifiers: Railroad grade crossings, DOT/5A, DOT/2C.

The objectives of the research were to analyze the effect on motorists of improving the warning devices at a high-accident, rural grade crossing, from 8-inch flashers to automatic gates and 12-inch flashers activated by a Marquardt speed predictor and having additional strobe lights; to evaluate suitable parameters to make the analysis; to study accident history and site conditions and relate these to motorist reaction to the system. It was shown that an activated gate arm can be as effective in slowing the average approaching vehicle as a train across the road. Train and signal conspicuity were a problem and contributed to the poor accident record of older drivers. The Strobe lights made the warning system more visible after activation.

PB-245 624/2GA PC$5.25/MF$2.25
Teledyne Brown Engineering, Huntsville, Ala.
Evaluation of Glare Reduction Techniques.
Final rept. 14 Jun 74-20 Jun 75,
W. L. Raine, N. E. Chatterton, and A. R. Dunn.
Sep 75, 120p DOT-HS-801 718
Contract DOT-HS-4-00925

Descriptors: *Passenger vehicles, *Visibility, *Glare, Motor vehicle operators, Visual perception, Luminance, Design standards, Photometry, Automobile bodies, Traffic safety.
Identifiers: DOT/5A, DOT/4DZ/DB.

Degradation of the visual capacity of a motor vehicle driver caused by luminous sources on the driver's own vehicle during daylight is quantified according to luminance glare theory. Effects of driver's age and daylight conditions are considered, and a means for laboratory measurement of vehicle glare production characteristics is developed. Based upon a probabalistic model of target detection, allowable glare in the field of view is determined. It is found that spot glare sources do not materially contribute to degradation of visual capacity (with the model), that the dash of the motor vehicle is generally the largest contributor to glare, and that suitable design changes to motor vehicles would allow them to meet the criterion established. Laboratory measurements with both collimated and diffuse sources are shown to be necessary to adequately evaluate motor vehicle performance.

PB-245 625/9GA PC$9.25/MF$2.25
South Carolina Univ., Columbia. Traffic and Transportation Center.
Rapid Commuter Transit for Medium Sized Urban Areas,
Hatim M. Hajj. Jan 75, 318p UMTA-SC-11-0002-75-1
Contract DOT-UT-419

Descriptors: *Urban transportation, *Buses(Vehicle), Planning, Travel patterns, Urban areas, Socioeconomic states, Bus lines, Passenger transportation, South Carolina.
Identifiers: Columbia(South Carolina), Modal split models, DOT/1A, DOT/4DZ/DG.

The approach to the problem took into account present and future travel, public attitudes and preferences available on-site facilities and state-of-the-art equipment, and the interest of local businessmen, financial agencies, and government officials in solving the problem prior to its continued development. Chapters include: An inventory of existing conditions in the Corridor; models and forecasts (1995) of planning and travel data; alternative transit concepts such as priority lanes and ramp metering; detailed analyses of the most promising transit alternatives; recommendations for the provision of high quality transit service in medium-sized urban areas; and the extent of applicability of these recommendations to medium-sized urban areas throughout the U.S.

PB-245 635/8GA PC$4.75/MF$2.25
Ultrasystems, Inc., Phoenix, Ariz. Dynamic Science Div.
Testing of Foreign Prototype Experimental Safety Vehicles-Program. Summary Report.
Final rept. Apr 74-Jul 75,
P. Boulay, S. Davis, and N. Johnson. Sep 75, 82p Dynamic Science-2310-75-117 DOT-HS-801 717
Contract DOT-HS-00860

Descriptors: *Automobiles, *Safety engineering, Crash tests, Design standards, Accident prevention, Structural design, Automobile bodies.
Identifiers: Experimental safety vehicles, Fiat automobiles, Nissan automobiles, Toyota automobiles, DOT/5A, DOT/4DZ/DB.

The document provides an summary of the Foreign Experimental Safety Vehicle Test and Evaluation Program. The report summarizes the testing conducted, presents summaries of the test results and includes references to NTIS documents in which the detailed test data may be found. The purpose of the program was to continue the quantitative nondestructive and crash testing of foreign prototype Experimental Safety Vehicles. The vehicles tested under this contract were the Fiat, Nissan, and Toyota ESVs. Specific tasks included: Initial Inspection and Evaluation of Design Parameters; accident avoidance tests; crash injury reduction tests; post-crash evaluations.

PB-245 638/2GA PC$5.75/MF$2.25
Cambridge Collaborative, Mass.
Vibration Prediction Model for Floating-Slab Rail Transit Track.
Final rept. Jul 73-Jun 75,
J. E. Manning, D. C. Hyland, and G. Tocci. Aug 75, 142p DOT-TSC-UMTA-75-17, UMTA-MA-06-025-75-13
Contract DOT-TSC-643

Descriptors: *Subway railways, *Noise reduction, *Railroad tracks, Mathematical models, Theory, Mathematical prediction, Railroad tunnels, Vibration damping, Measuring instruments, Oscillators.
Identifiers: Floating slab tracks, DOT/2C, DOT/5B.

This report presents the theoretical development of a model to predict the vibration reduction by floating-slab tracks in subway tunnels. Data from a field study in New York City are also presented. The report is one of three reports dealing with noise and vibration control for urban rail transit track and elevated structures. The theoretical model described allows for the prediction of the force transmissibility--the ratio of the amplitudes of the force on the tunnel floor and the force on the rail. Data from the field study support the use of a simple single-degree-of-freedom oscillator for predicting vibration reduction. The theoretical model developed allows predictions to be made for a more general case.

PB-245 668/9GA PC$7.25/MF$2.25
Applied Science Associates, Inc., Valencia, Pa.
Survey of Safety Related Conditions in School Buses.
Final rept. 25 Jun 74-18 Jun 75,
Richard L. Dueker, and Richard M. Thackray, Jr. Jun 75, 216p ASA-367 DOT-HS-801 659
Contract DOT-HS-4-00947

Descriptors: *Buses(Vehicles), *Safety engineering, Failure, Chassis, Manufacturers, Mechanical measurement, Safety factor, Field tests, Interviews, Accident prevention.
Identifiers: *School buses, DOT/5A, DOT/4DZ/DG.

The objective of this study was to survey a nationwide sample of school bus operators in order to identify and document mechanical conditions which, in the opinion of bus fleet personnel, had an impact on the safe operation of the buses, and which did not appear to be the result of inadequate/inappropriate maintenance procedures, abusive operation, or normal wear. The results of the survey consist of: (1) A list of the 368 conditions documented during the survey. Each condition is identified as a chassis or body condition, and is listed by manufacturer and bus subsystem. (2) A detailed description of 58 safety-related conditions which were judged to be significant in terms of one, or both, of the following criteria: pervasiveness (i.e., a number of operators reported the condition); operator-reported criticality (i.e., fleet personnel indicated that the condition could likely result in serious safety consequences). (3) The following data summaries: Safety-related mechanical conditions as a function of chassis and body manufacturer, safety-related mechanical conditions as a function of operating variables, and data quality as a function of operator characteristics.

PB-245 723/2GA PC$4.25/MF$2.25
Southwest Research Inst., San Antonio, Tex.
Uniform Tire Quality Grading-Treadwear (City Test).
Final rept. Apr-Jul 75,
R. N. Pierce, and K. B. Davis. Sep 75, 65p DOT-HS-801 735
Contract DOT-HS-5-01070
See also PB-244 512.

Descriptors: *Automobile tires, *Treads, *Wear tests, Belts, Bias, Road tests, Service life, Wear resistance, Routes, Project planning, Validity, Recommendations.
Identifiers: Radial tires, Belted tires, Bias tires, DOT/4DZ/DB, DOT/5E.

The development of a practical means of establishing relative passenger tire treadwear rates has been the basis of an ongoing study. The data from specific tests are used to grade tires in respect to treadwear in response to the criteria set forth by the National Traffic and Motor Vehicle Safety Act of 1966. Several efforts are being made to provide expeditious and practical, yet accurate, procedures by imposition of closely controlled and regulated wear-type maneuvers over a pre-selected test course. In the interest of universal application, this study provides for the design of such a course on readily available public thoroughfares.

PB-245 761/2GA PC$3.25/MF$2.25
Mueser, Rutledge, Wentworth and Johnston, New York.
Subsurface Investigation Section A006b, Rockville Route.
Rept. no. 2.
30 Sep 75, 14p MRWJ-75-141
Prepared in cooperation with Washington Metropolitan Area Transit Authority, D.C., and De Leuw, Cather and Co., Inc., Washington, D.C.

Descriptors: *Subway railways, *District of Columbia, *Routes, *Subsurface investigations, Foundations, Rock mechanics, Tunneling(Excavation), Subsurface structures.
Identifiers: Foundation engineering, *Rockville route, Design section A006b.

Results are presented of two slant borings made from the inbound running tunnel mined through the location of Zoological Park Station in Section A006b of Rockville Route of the Washington Metropolitan Area Metro System, north of Rock Creek in northwest Washington, D.C. The purpose of the work was to provide information on the probable extent and orientation of shear zones which were expected to pass through the position of the station entrance excavation on the west side of Zoological Park Station. The report contains geological

sections illustrating conditions along the line of these borings, logs of the borings and a discussion of general subsurface conditions.

PB-245 774/5GA PC$10.00/MF$2.25
De Leuw, Cather/STV, Washington, D.C.
Northeast Corridor High-Speed Rail Passenger Service Improvement Project. Task 3. Track and Structures Standards Development.
Final rept.,
R. P. Howell, R. A. Kendall, G. M. Magee, M. C. Holowaty, and K. J. Holness. Sep 75, 355p
FRA/ONECD-75/3
Contract DOT-FR-40026
See also PB-243 419.

Descriptors: *Rapid transit railways, *Passenger transportation, *Northeast Region(United States), Railroad tracks, Maintenance, Cost effectiveness, Rail transportation, Tunnels, Standards.
Identifiers: Life cycle costs, DOT/2C, DOT/1B, Commuter rail systems.

Track and structure characteristics and problem areas to be encountered in upgrading the Corridor are discussed. Standards considerations and applicability are outlined along with the maintenance history of the Corridor. Track system options for application to 150 MPH High Speed Rail (HSR) service are discussed and performance records examined. Concrete ties, fastener systems and ballastless track (concrete slab) are considered with wood tie track in a structural and cost effective investigation. Factors of type and frequency level of HSR train service and potential joint usage with freight movements are projected for these analyses. With this information, design parameters such as lateral and vertical track stability are investigated and established. On basis of structural integrity, selected track system candidates are costed over a 50 year life cycle of construction and maintenance. All projected maintenance items are described in detail with cycle rationale delineated.

PB-245 777/8GA PC$4.25/MF$2.25
Mueser, Rutledge, Wentworth and Johnston, New York.
Subsurface Investigation Section C010b, Huntington Route.
Rept. no. 25.
10 Oct 75, 73p MRWJ-75-130
Prepared in cooperation with Washington Metropolitan Area Transit Authority, D.C., and De Leuw, Cather and Co., Inc., Washington, D.C.

Descriptors: *Subway railways, *District of Columbia, *Routes, *Subsurface investigations, Foundations, Rock mechanics, Tunneling(Excavation), Subsurface structures.
Identifiers: Foundation engineering, *Huntington Route, Design section C010b.

Results are presented of 74 test borings made along the line of the METRO trackage in Section C010b of Huntington Route, generally in the City of Alexandria and crossing the Valley of Cameron Run south of the city to Huntington Station in Rose Hill of the Washington Metropolitan Area Metro System. The report contains a continuous geological section along the line of the trackage, logs of the borings, results of tests performed on samples obtained in the borings and a text summarizing anticipated design and construction problems.

PB-245 933/7GA PC$17.25/MF$2.25
National Highway Traffic Safety Administration, Washington, D.C.
Motor Vehicle Safety Defect Recall Campaigns Detailed Reports from April 1 to June 30, 1953.
Quarterly rept.
Jul 75, 781p DOT-HS-801 662
See also report dated Apr 75, PB-244 471.

Descriptors: *Motor vehicles, *Defects, *Manufacturers, *Safety, Failure, Passenger vehicles, Trucks, Automobiles, Trailers, Tires.
Identifiers: *Motor vehicle safety defect recall, DOT/5A, DOT/4DZ.

The document contains detailed information regarding defect recall campaigns conducted by domestic and foreign automobile and equipment manufacturers during the second quarter of 1975.

PB-246 101/0GA PC$3.25/MF$2.25
Mueser, Rutledge, Wentworth and Johnston, New York.
Subsurface Investigation, 10th Street Mall Bridge, Section D004, New Carrollton Route.
Rept. no. 1.
26 Sep 75, 18p MRWJ-75-140
Sponsored by Washington Metropolitan Area Transit Authority, D.C., and De Leuw, Cather and Co., Inc., Washington, D.C.

Descriptors: *Subway railways, *District of Columbia, *Routes, *Subsurface investigations, Foundations, Rock mechanics, Tunneling(Excavation), Subsurface structures.
Identifiers: Foundation engineering, *New Carrollton Route, Design section D004, 10th Street Mall Bridge, Washington Metro system.

Results are summarized of seven supplementary test borings made to investigate subsoil conditions at the location of piers of the 10th Street Mall Bridge crossing the Penn Central Railroad tracks adjacent to D Street S.W. in southwest Washington, D. C. The purpose of the exploration was to ascertain the condition of soils immediately overlying the mined tunnels which could have been affected by settlements occurring during the mining operation. The report contains geological sections along the lines of the bridge piers, logs of the test borings, results of laboratory tests performed on samples obtained and a brief text describing results of the investigation.

13G. Hydraulic and Pneumatic Equipment

AD-A016 298/2GA PC$4.25/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
Axial Flow Rotor Unsteady Response to Circumferential Inflow Distortions.
Technical memo.,
E. P. Bruce, and R. E. Henderson. 13 Aug 75, 53p Rept no. TM-75-208
Contract N00017-73-C-1418

Descriptors: *Turbomachinery, *Noise reduction, *Fuel consumption, *Flow fields, Nonuniform flow, Problem solving, Economics, Turbine blades, Response, Distortion, Velocity, Pressure, Force(Mechanics), Axial flow turbines, Moments, Axial flow fans, Incompressible flow, Rotor blades(Turbomachinery), Theory.

The unsteady response of an axial flow fan rotor to steady, circumferential inflow velocity distortions has been evaluated by investigation of the unsteady normal force and pitching moment on a chordwise element of a rotor blade. Experimental measurements of these unsteady characteristics are presented as a function of the geometry of the rotor -- stagger angle, solidity and steady angle of incidence -- for sinusoidally varying circumferential distortions with different numbers of distortion cycles. These measurements are compared with two theoretical analyses.

AD-A016 455/8GA PC$5.75/MF$2.25
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
Testing a Fluidic Temperature Sensor on a Subscale Ramjet Engine Combustion Chamber.
Technical rept. Sep-Dec 73,
John T. Hojnacki. Jun 75, 134p Rept no. AFAPL-TR-75-I

Descriptors: *Ramjet engines, *Combustors, *Temperature sensitive elements, *Fluidic control, Fuel systems, Fluid control, Thermocouples, Combustion chamber gases.
Identifiers: *Fuel flow control.

Data obtained from 26 tests that used three fluidic temperature sensors to measure gas temperatures in a subscale ramjet engine combustion chamber are presented. The test variables for the combustion chamber were chamber pressure and chamber temperature. Tests were conducted using nominal chamber pressures of 35 and 70 psia and chamber total temperatures of 2500 R, 3000 R, and 3800 R. One of the sensors used various insulator materials which were magnesium oxide, Hastelloy X, and zirconium oxide. These materials varied the conduction heat losses from the sensor body to the outer case. The mass flow through a sensor was increased by a factor of three to see if improvements could be made in reducing steady state error or increasing thermal response. Lastly, one test was conducted using an ablative lined combustion chamber that provided a long duration run.

AD-A016 862/5GA PC$3.25/MF$2.25
Picatinny Arsenal Dover N J
Position Detection for Pneumatic Cylinders.
Technical memo,
Joseph Lebzelter. Sep 75, 12p Rept no. PA-TM-2169

Descriptors: *Pneumatic devices, *Cylinders, *Position(Location), Fluidic control, Pneumatic valves, Safety and arming(Ordnance), Detectors.

The two most widely used techniques for position detection on pneumatic logic controlled production equipment are the use of limit valves and of sequencing. These techniques are also suitable for use with fluidic logic. This report describes a new technique of position detection by determining the location of cushioning in a pneumatic cylinder, as recently developed by the Ammunition Engineering Directorate, Picatinny Arsenal. It also includes a comparison of that technique with the widely used one employing limit valves and sequencing.

PB-245 321/5GA PC$8.75/MF$2.25
Stanford Univ., Calif. Thermosciences Div.
The Effects of System Rotation on Separation, Reattachment and Performance in Two-Dimensional Diffusers,
P. H. Rothe, and J. P. Johnston. May 75, 297p
PD-17
Grant NSF-GK-16450

Descriptors: *Diffusers, *Centrifugal compressors, *Rotation, Coriolis force, Stalling, Flow distribution, Boundary layer separation, Simulation, Compressor blades, Two dimensional flow, Tests, Experimental data.
Identifiers: *Rotational flow, Flow reattachment.

The report covers experimental studies of the effects of system rotation on flow in, and performance of two-dimensional diffusers of two types: (i) straight walled diffusers with smooth fairing at the inlet duct, and (ii) sudden expansion, step walled diffusers. Flow regime maps and static pressure recoveries are obtained for type (i). For type (ii) the basic turbulence

phenomena in the free-shear layer downstream of the step are studied and data on reattachment to the downstream wall are obtained. The important stabilizing, and destabilizing effects of rotation are emphasized.

13H. Industrial Processes

AD-A016 308/9GA PC$9.25/MF$2.25
Army Materiel Command Texarkana Tex Intern Training Center
A Sampled Data Production Controller Using Predictive Error Correction.
Final rept.,
Gerald A. Klopp. Dec 73, 305p Rept no. USAMC-ITC-02-08-73-208

Descriptors: *Production control, *Ammunition, *Computer applications, Hybrid simulation, Mathematical models, Computer programs, Logic circuits, Control theory, Interfaces.
Identifiers: SCAMP(Small Caliber Ammunition Modernization Program), Small caliber ammunition modernization program.

The objective of this research project is to study the implementation of a predictive state variable sampled data controller for a large scale production system. Although this research will be directed specifically towardds the Small Caliber Ammunition Modernization Program (SCAMP), the procedures developed will be applicable to any production system which can be modeled as a sampled data control system. To achieve this objective, (1) the ammunition production plant is modeled in state variable form, (2) the results of (1) are solved as discrete difference equations as a function of a discrete time interval and initial conditions, (3) the solution of (2) with the present state of (1) as the initial conditions becomes the predictive controller for the process, and (4) extensive logic control circuitry is developed to aid the digital computer in the control of the system. The result of the research shows that the predictive controller is very effective in increasing the stability of the sampled data controller for sample times which would lead to oscillations in systems which do not use predictive control.

AD-A016 837/7GA PC$7.25/MF$2.25
Aluminum Co of America Alcoa Center Pa Alcoa Labs
Optimization of Equipment and Techniques for Welding Aluminum in the Thickness Range of About 1/16 to 1/4 Inch.
Final rept. 28 Jun 74-1 Jul 75,
Richard K. Sager, Paul B. Dickerson, James E. Grant, Walter R. Reichelt, and Maurice C. Sharp. 29 Sep 75, 208p
Contract N00024-74-C-5502

Descriptors: *Welding, *Aluminum alloys, Gas metal arc welding, Resistance welding, Explosive welding, Electron beam welding, Butt welding, Panels, Welds, Shipbuilding, Inert gas welding, Machines, Ultrasonic tests, Nondestructive testing, Optimization.
Identifiers: Aluminum alloy 5456.

The laboratory phase of this contract fabricated fillet welded panels, using gas metal arc welding (GMAW), pulsed GMAW, high-frequency resistance welding, explosion welding, and electron beam weldtrusion (inchamber). Butt weld investigations included conventional GMAW, plasma GMAW, and sliding seal electron beam (out of chamber). For conventional GMAW welding, power sources, shielding gas mixtures, and travel speeds were evaluated for their effect on panel distortion, joint soundness and strength. All of the specimens were evaluated for static and fatigue strength, corrosion fatigue, corrosion resistance, hardness, residual stress, shrinkage, heat input and distortion. The contract analyzes the results of fabrication and evaluation of the fabricated specimens, along with equipment costs and economics to attempt to determine the optimum weld process for various types of ship construction.

AD-A016 971/4GA PC$3.75/MF$2.25
Hitchiner Mfg Co Inc Milford N H
Machine Casting of Ferrous Alloys.
Interim rept. Feb-Jun 75,
G. D. Chandley, and Gary Scholl. Sep 75, 35p
AMMRC-CTR-75-18
Contract DAAG46-73-C-0112, ARPA Order-2267

Descriptors: *Casting, Molding techniques, Molds(Forms), Dies, Slurry coating, Steel.
Identifiers: Machine casting.

Due to the lack of economic permanent die materials for use in Hipocasting ferrous alloys, three innovative approaches for creating a mold cavity for use in machine casting of ferrous alloys were explored. They were: use of liquid metal cooling of a thin walled die, use of a porous die, vacuum coated with dry ceramic and use of a membrane to vacuum from a disposable mold. Vacuum forming a disposable mold appears to be the most promising method for machine casting of ferrous alloys.

COM-75-11397/7GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Optical Physics Div.
Semiconductor Measurement Technology: Optical and Dimensional-Measurement Problems with Photomasking in Microelectronics.
Special pub.,
John M. Jerke. Oct 75, 45p NBS-SP-400-20
ARPA Order-2397
Library of Congress Catalog Card no. 75-619190.

Descriptors: *Masking, *Integrated circuits, Microelectronics, Photolithography, Dimensional measurement, Quality control, Optical equipment.
Identifiers: *Photomasking.

Photomasks are the basic artifacts for transferring design geometry to the semiconductor wafer in integrated circuit (IC) production. Currently, photo-lithographic techniques using optical equipment are the primary means for both fabricating masks and using masks to print patterns on wafers. The present study was to identify the major optical and dimensional-measurement problems related to the fabrication and use of masks. The results show that the primary optical problems are those related directly to the use of optical instruments for dimensional measurements of IC pattern geometry. Furthermore, most suppliers and users of optical equipment for mask fabrication do not conduct sufficient optical testing to determine imaging performance. The basic limitations derived from light diffraction and coherence continue to limit the quality of masks and IC devices with sub-micrometre geometry, and acceptable units are produced generally on a best-effort basis.

COM-75-50578/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Magnetic Retention of Evaporation or Sputtering Masks (Abstract Only).
Final rept.,
Frank E. Jones. Jun 75, 1p
Pub. in Review of Scientific Instruments, v46 n6 p793 Jun 75.

Descriptors: *Retaining, Magnetic fields, Masking, Substrates, Thin films.
Identifiers: Masks, Reprints.

The use of a magnet to clamp a magnetic metal mask to the substrate during sputtering of thin film patterns has been described by Ingle. A similar technique was described previously by Jones and Castle in this journal and in a patent.

N75-31286/8GA PC$3.75/MF$2.25
Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium).
Machine Tool Precision Control Using Lasers le Controle au Laser de la Precision de Machines en Atelier.
J. Defraine, and L. Janssen. May 75, 29p CRIF-NT-11
Language in French.

Descriptors: *Checkout, *Helium-neon lasers, *Interferometers, *Machine tools, *Performance tests, *Tolerances (Mechanics), Compensation, Error analysis, Linearity, Position (Location), Position errors.

For abstract, see STAR 1322

N75-31450/0GA PC$3.75/MF$2.25
Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium).
Boring out of Deep Holes Without Chatter Alesage des Trous Profonds Sans Broutage.
J. Donies, and L. Vandennoortgate. Jun 74, 33p CRIF-NT-10
Language in French.

Descriptors: *Boring machines, *Grinding (Material removal), *Parabolas, *Vibration isolators, Directional stability, Dynamic response, Dynamic stability, Resonant vibration, Rotary stability.

For abstract, see STAR 1322

PATENT-3 824 014 Not available NTIS
Department of the Navy Washington D C
Relief Mask for High Resolution Photolithography.
Patent,
Joseph L. Abita. Filed 26 Jul 73, patented 16 Jul 74, 4p Rept nos. PAT-APPL-383 023,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Masks, *Photolithography, *Patents, Masking, Substrates, Microminiaturization.
Identifiers: PAT-CL-355-75.

The patent relates to a mask comprising a mask pattern disposed on the planar surface of a raised mound extending from a flat backing plate. The invention insures intimate contact between the mask pattern and a substrate surface to be masked even though said substrate surface may have an excess deposit of photoresist or other material around the perimeter thereof. The invention relates to mask construction for use in the photofabrication of microminiature electronic devices, particularly those devices requiring the use of high resolution photolithographic techniques in the fabrication thereof.

PATENT-3 827 619 Not available NTIS
Department of the Navy Washington D C
Ultrasonic Bond Monitor.
Patent,
John H. Cusick, Alvin E. Brown, Al S. Hamamoto, and Jack L. S. Bellin. Filed 19 Jan 73, patented 6 Aug 74, 6p Rept nos. PAT-APPL-325 272,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Ultrasonic welding, *Monitors, *Patents, *Nondestructive testing, Bonded joints, Monitoring, Quality control.
Identifiers: PAT-CL-228-1.

The patent describes a system and method for monitoring the bond strength of ultrasonic bonds. A measure of bond quality is obtained non-destructively, by developing a voltage which proportional to the amplitude of the transverse motion of the ultrasonic bonding tool, and also developing, by means of a transducer, a second voltage proportional to the tangential component of the forces applied during bonding. The voltages are fed into a logic curcuit to derive their ratio, which is a measure of the bonding quality.

13I. Machinery and Tools

AD-A016 660/3GA PC$4.75/MF$2.25
LTV Aerospace Corp Dallas Tex Vought Systems Div
S-3A Graphite/Epoxy Spoiler Fabrication for Flight Evaluation.
Final rept. 21 Jun 74-21 Mar 75,
O. E. Dhonau, E. G. Blosser, B. V. Bryant, G. Bourland, and S. A. McGovern. Mar 75, 89p
Rept no. 2-53443/5R-3206 NADC-75217-30
Contract N62269-74-C-0629

Descriptors: *Antisubmarine aircraft, *Aerodynamic control surfaces, *Spoilers, Fabrication, Tools, Curing, Cost analysis, Quality assurance, Composite materials, Graphite, Epoxy resins.
Identifiers: S-3 aircraft, S-3A aircraft, *Tooling.

The program was initiated in June 1974 to revise the design and produce for flight evaluation 4 ship sets of graphite epoxy lower left hand and right hand spoilers for the S-3A aircraft. Design changes were required to provide installative instructions and to provide a production, trailing edge seal installation. A left hand tool was available from the previous program, but a right hand tool had to be fabricated. Several manufacturing improvements were introduced to reduce manhours per part in the fabrication operations. The tools were reworked and prepared for use, but in the checkout stage were found to leak air in excess of the specification tolerance. After repeated unsuccessful attempts at sealing, the problem was circumvented by a double bagging technique for autoclave curing in order to meet the completion schedule. Extra manhours per part were required and were accounted for in the cost accumulation.

AD-A016 878/1GA PC$4.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Ground Equipment/Materials Directorate
Three Dimensional Vibration Isolator Analog Computer Analysis.
Technical rept.,
E. R. Chubbuck. 18 Jun 75, 69p Rept no. RL-75-11

Descriptors: *Vibration isolators, *Mathematical models, *Computer programs, Rocket exhaust, Mathematical analysis, Three dimensional, Analog computers, Rocket launchers, Rocket launching, Equations of motion, Nonlinear systems, Kinematics, Impingement.

Based on a previous study of a multiaxes isolation system, a mathematical model was made of the isolation system. The resulting equations of motion were nonlinear, ordinary, coupled, and solved on an analog computer. The model strives for realism by including detent forces between the rocket and launcher, rocket exhaust impingement on the frontal surface of the launcher, and mass and inertia changes because of launch. Computer diagrams and lists of data are given by this report. (Author)

NTIS/PS-75/801/1GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Journal Bearings (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Guy E. Habercom, Jr. Nov 75, 125p*
See also NTIS/PS-75/802.

Descriptors: *Bibliographies, *Journal bearings, Hydrodynamics, Fluid dynamics, Mechanical properties, Lubricants, Lubrication, Abstracts.

Design and performance of journal bearings are discussed in these Government-sponsored research reports. Operation in diversified environments such as liquid metals and gases is investigated. (Contains 120 abstracts).

NTIS/PS-75/802/9GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Thrust, Sleeve and Jewel Bearings (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Guy E. Habercom, Jr. Nov 75, 70p*
See also NTIS/PS-75/803.

Descriptors: *Bibliographies, *Thrust bearings, *Sleeve bearings, *Jewel bearings, Hydrodynamics, Mechanical properties, Fluid dynamics, Lubrication, Abstracts.

Design and performance of thrust, sleeve and jewel bearings are reviewed in these Government-sponsored research reports. Lubrication effects, torque effects, and bearing hydrodynamics are among the physical properties investigated. (Contains 65 abstracts)

NTIS/PS-75/803/7GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Roller Bearings (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Guy E. Habercom, Jr. Nov 75, 109p*
See also NTIS/PS-75/804.

Descriptors: *Bibliographies, *Roller bearings, Antifriction bearings, Elastohydrodynamics, Rolling contact loads, Mechanical properties, Lubrication, Abstracts.

Design and performance of roller bearings are discussed in these Government-sponsored research reports. Rolling contact bearing surfaces, hardening methods, and fatigue life are among the areas investigated. (Contains 104 abstracts)

NTIS/PS-75/804/5GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Liquid Bearings (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Guy E. Habercom, Jr. Nov 75, 67p*
See also NTIS/PS-75/805.

Descriptors: *Bibliographies, *Liquid bearings, Hydrostatics, Fluid flow, Liquid metals, Lubricants, Fatigue life, Abstracts.

Design and performance of hydrostatic and hydrodynamic bearings are investigated in these Government-sponsored research reports. Wear resistance, lubrication effectiveness, and performance in liquid environments are some of the parameters reviewed. Cryogenic and liquid metal environments are included. (Contains 62 abstracts)

NTIS/PS-75/805/2GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Ball Bearings. Volume 1. 1964-1971 (A Bibliography with Abstracts).
Rept. for 1964-71,
Guy E. Habercom, Jr. Nov 75, 125p*
See also NTIS/PS-75/806.

Descriptors: *Bibliographies, *Ball bearings, Metal coatings, Fatigue life, Service life, Lubrication, Surface roughness, Wear resistance, Abstracts.

Design and performance of ball bearings are investigated in these Government-sponsored research reports. Wear resistance, lubrication means and effectiveness, and physical properties are some of the parameters reviewed. (Contains 120 abstracts)

NTIS/PS-75/806/0GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Ball Bearings. Volume 2. 1972-September, 1975 (A Bibliography with Abstracts).
Rept. for 1972-Sep 75,
Guy E. Habercom, Jr. Nov 75, 105p*
See also NTIS/PS-75/807.

Descriptors: *Bibliographies, *Ball bearings, Metal coatings, Fatigue life, Service life, Lubrication, Surface roughness, Wear resistance, Abstracts.

Design and performance of ball bearings are investigated in these Government-sponsored research reports. Wear resistance, lubrication means and effectiveness, and physical properties are some of the parameters reviewed. (Contains 100 abstracts)

NTIS/PS-75/807/8GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Gas Bearings. Volume I. 1964-1970 (A Bibliography with Abstracts).
Rept. for 1964-Dec 70,
Guy E. Habercom, Jr. Nov 75, 157p*
See also NTIS/PS-75/808.

Descriptors: *Bibliographies, *Gas bearings, Design, Lubrication, Stability, Performance evaluation, Utilization, Abstracts.

The design, performance, and applications of gas bearings are investigated in these Government-sponsored research reports. Gas bearing configuration, gas flow, lubrication, bearing loading, and bearing stability are among the parameters reviewed. (Contains 152 abstracts)

NTIS/PS-75/808/6GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Gas Bearings. Volume 2. 1971-August, 1975 (A Bibliography with Abstracts).
Rept. for 1971-Aug 75,
Guy E. Habercom, Jr. Nov 75, 143p*
Supersedes NTIS/PS-75/243. See also NTIS/PS-75/807.

Descriptors: *Bibliographies, *Gas bearings, Design, Lubrication, Stability, Performance evaluation, Utilization, Abstracts.

The design, performance, and applications of gas bearings are investigated in these Government-sponsored research reports. Gas bearing configuration, gas flow, lubrication, bearing loading, and bearing stability are among the parameters reviewed. (Contains 138 abstracts)

PATENT-3 905 660

Not available NTIS

National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

Drilled Ball Bearing with a One Piece Anti-Tipping Cage Assembly.

Patent.

A. S. Irwin. Patented 16 Sep 75, 5p PAT-APPL-450 505

Misc-Filed 12 Mar. 1974 Supersedes N74-18133 (12 - 09, p 1055). Subm-Sponsored by NASA.

Government-owned invention available for licensing. Copy of patent available from Commissioner of Patents, Washington, D.C. 20231 $.50.

Descriptors: *Ball bearings, *Forming techniques, *Machining, Equipment specifications, *Patents, Structural stability, Temperature effects, Vibration effects.

Identifiers: PAT-CL-308-191.

A drilled ball bearing is disclosed which has a pair of projections machined or otherwise formed from the inner surface of each of the cage pockets. These projections prevent misorientation of the openings of the drilled passages of the balls with respect to the surfaces of the inner and outer races. The machining of the projections from the inner surface of each of the cage pockets forms a unitary one piece structure which has improved resistance to fragmentation caused by either thermal or vibrational effects when compared to conventional two piece anti-tipping cage assemblies.

13J. Marine Engineering

AD-A016 368/3GA PC$5.25/MF$2.25

Naval Academy Annapolis Md Div of Engineering and Weapons

Containerized Command/Control Spaces: A Feasibility Study.

Final rept.,

J. M. McGarrah, F. J. Brasco, O. P. Keifer, H. L. Seedorf, and M. S. Skorich. Jul 73, 125p

Descriptors: *Naval vessels, *Command and control systems, *Modular construction, Containers, Containerizing, Structural members, Electric connectors, Pipe fittings, Fastenings, Experimental design.

Specific questions pertaining to the modularization of Command and Control spaces aboard a naval combatant ship are addressed. An 8' x 8' x 20' container is used. Container construction, configuration, attachments, and arrangements are discussed. Fluid, power, and data flow problems are examined. Selection matrices for each area are presented and specific recommendations made.

AD-A016 369/1GA MF$2.25

Stevens Inst of Tech Hoboken N J Davidson Lab

Measurements of the Mean Lateral Force and Yawing Moment on a Series 60 Model in Oblique Regular Waves,

Paul G. Spens, and Petros A. Lalangas. Jun 62, 34p Rept no. SIT-DL-880

Contract NOnr-263(21)

Availability: Available in microfiche only.

Descriptors: *Ship motion, *Ocean waves, *Force(Mechanics), Angle of attack, Steering, Ship models, Hydrodynamics, Test facilities, Directional, Yaw, Moments, Model tests, Measurement, Towed bodies, Self propelled.

This report describes measurements of the mean lateral force and yawing moment exerted by oblique regular waves on a free-to-oscillate Series 60, 0.60 block coefficient model. It also presents measurements made of the lateral force and moment on the same model towed in calm water at various yaw angles. The possibility of using these data to predict the leeway angle for a free model in oblique waves is investigated, and it is shown that such a procedure may lead to errors, especially in the case of short wavelengths.

AD-A016 383/2GA PC$3.75/MF$2.25

Naval Postgraduate School Monterey Calif

A Survey of the Pressure Distribution Within the Plenum Chamber of the XR-3 Testcraft.

Master's thesis,

Rodman Michael Eddy. Sep 75, 42p

Descriptors: *Surface effect ships, *Plenum chambers, *Pressure gradients, Pressure measurement, Hulls(Marine), Seals, Lift, Hydrostatic pressure, Theses.

Identifiers: XR-3 Vessel.

A pressure survey of the cavity (plenum chamber) was conducted on the XR-3 Surface Effect Ship (SES) Testcraft. The lowest pressures were observed at 15 knots, and the highest pressures at 21 knots. Pressure variations with velocity were observed to be similar in all cases, with a pressure decrease from 12 to 15 knots, an increase from 15 to 21 knots, a fluctuation and slight decrease from 21 to 24 knots, and a decrease from 24 to 26.5 knots. All pressures have been plotted to show graphically the pressure variation versus velocity and position within the plenum chamber from bow seal to stern seal, and from port side to starboard side. The shape and gradient of pressures was observed to vary directly with velocity.

AD-A016 680/1GA PC$3.75/MF$2.25

Michigan Univ Ann Arbor Ship Hydrodynamics Lab

Resistance Test Results for 1/12 Scale Models of Three Planing Catamarans.

James L. Moss. Jul 59, 31p Rept no. 02644

Contract N00014-67-A-0181-0050

Descriptors: *Catamarans, *Planing surfaces, *Hydrodynamics, Resistance, Model tests, Test methods, Scale models, Hulls(Marine), Center of gravity, Mathematical prediction, Lift to drag ratio, Configurations.

Identifiers: *Frictional resistance, Trim angles, Design, Spacing.

Still water resistance tests were conducted on three hard chine planing catamaran models. Total resistance, LCG rise and change in running trim were measured. Hull spacing and displacement were the fundamental parameters which were varied. The models were built to a linear scale ratio of 12:1 and represented a full scale boat length of 65 ft. overall. The full scale speed range was from 10 knots to 30 knots. Two of the three hull disigns were symmetric about the centerplane and differed from each other only in details of the lines. The third set of hulls were asymmetric about the centerplane.

AD-A016 682/7GA PC$3.75/MF$2.25

Michigan Univ Ann Arbor Dept of Naval Architecture and Marine Engineering

Shallow-Water Performance of a Planing Boat,

Andras Istvan Toro. 25 Apr 69, 40p Rept no. 019

Contract N00014-67-A-0181-0050

Descriptors: *Boats, *Planing surfaces, *Hydrodynamics, *Shallow water, Hulls(Marine), Resistance, Velocity, Model basins, Test methods, Test equipment, Depth, Center of gravity.

Identifiers: Froude number.

The results of a planing-boat model resistance test program conducted at four different water depths, including deep water, and three locations of LCG are presented. The sensitivity of the resistance of a planing boat to shallow water through the critical speed range (Fnh = 0.5-3.5) is analyzed and compared with the deep-water results. The paper also gives extrapolated results for a boat of 100,000 lb gross weight. Model and full-scale results are presented in convenient graphical and tabular form for further use.

AD-A016 712/2GA PC$4.25/MF$2.25

Bolt Beranek and Newman Inc Cambridge Mass

Calculated Unsteady Lift and Moment Characteristics for the AGEH Hydrofoil, Based on Two-Dimensional Theory.

Technical memo.,

J. I. Smullin. 8 Mar 74, 63p Rept no. BBN-TM-185

See also rept. no. BBN-1970 dated Jan 71, AD-717 681.

Descriptors: *Hydrofoils, *Nonuniform flow, *Lift, Mathematical models, Moments, Hydrodynamics, Flaps(Control surfaces), Computer programming, Computations, Graphics, Experimental data, Theory, Two dimensional, Oscillation.

Identifiers: *Unsteady flow, AG(EH) vessels.

Unsteady lift and moment characteristics of the flap controlled hydrofoil for the AGEH PLAINVIEW have been calculated. Calculations have been done for characteristics when the flap is oscillating and when the foil and flap are fixed and heading into regular waves. Calculations were made with computer programs which determine the unsteady hydrodynamic coefficients of a hydrofoil near a free surface. Some modification of the programs were made in order to make the output format compatible with that used by NSRDC to facilitate comparison of the computed results with results of the NSRDC model tests of the PLAINVIEW hydrofoil. Numerical results are given in graphic and tabular form, and listings of the computer programs are included.

AD-A016 798/1GA PC$4.25/MF$2.25

Stevens Inst of Tech Hoboken N J Davidson Lab

Preliminary Hydrodynamic Model Tests of Several LVA Planing Hull Concepts.

Final rept.,

Daniel Savitsky, Edward Numata, and Michael Chiocco. Oct 75, 63p Rept no. SIT-DL-75-1840

Contract N00014-75-C-0746

Descriptors: *Planing surfaces, *Ship hulls, Amphibious ships, Hydrodynamic configurations, Model tests, Ship models, Seakeeping, Hydrodynamic control surfaces, Flaps(Control surfaces), Ship bows, Model basins, Surface roughness, Sea states, Impact acceleration, Loads(Forces), Head on orientation, Ship motion, Lift to drag ratio, Horsepower, Heaving, Velocity.

Identifiers: *Planing hulls, LVA class vessels.

Exploratory hydrodynamic model tests were conducted to investigate the resistance and seakeeping character of two possible LVA planing hull forms. Additional studies were made to evaluate the effects on hydrodynamic performance of adjustable transom flaps and fixed chine flaps. For a 55,000 lb. gross weight, the planing inception speed was between 10 and 25 knots. The impact accelerations and motions in a head sea state 2 are comparable with with those observed for well-designed planing hulls and appear to be within the requirements for maintaining proficiency as defined by MIL-STD 1472-A. The added resistance in a head sea is larger than for conventional planing hulls. Bow form improvements are recommended to reduce the resistance and accelerations in a seaway. Computed and measured values of EHP and trim for zero flap deflection are in good agreement. (Author)

AD-A016 816/1GA PC$3.25/MF$2.25

Naval Underwater Systems Center New London Conn New London Lab

A New Technology for Suspended Electromechanical Cable and Sensor Systems in the Ocean - A Summary of the Cable Development Program.
Technical document,
Richard C. Swenson, and Marvin C. Goodman.
12 Sep 75, 16p Rept no. NUSC-TD-5233
See also Rept. no. NUSC-TR-4915 dated 22 Sep 75.

Descriptors: *Cables, Electromechanical devices, Cable fairings, Cable assemblies, Hydrophones, Lightweight, Suspension devices, Fishes, Bites and stings, Synthetic materials, Detectors.

This document summarizes a new technology developed explicitly for improved suspended sensor systems in the ocean. It describes briefly the systems approach, analytical techniques, synthetic strength members, cable construction, in-line sensors, fairing, buoyancy, end fittings, conductors, insulation bonding, and cost advantages currently being utilized for improved performance, versatility, and reliability at lower overall cost. It is based on the more detailed information presented in The Cable Development Program for Suspended Applications, NUSC Technical Report 4915, 22 September 1975. (Author)

AD-A016 833/6GA PC$4.25/MF$2.25
David W Taylor Naval Ship Research and Development Center Bethesda Md Ship Performance Dept
Performance of Cycloidal Propellers in Cavitating Environment,
G. F. Dobay, and M. C. Dickerson. Dec 69, 61p Rept no. SPD-363-01

Descriptors: *Cycloidal propellers, *Cavitation, Propellers(Marine), Steering, Pitch(Inclination), Thrust, Torque.

This report presents the results of cavitation tests and shows the effects of cavitation on a 9-inch orbital diameter cycloidal propeller in the 24-inch variable-pressure water tunnel at the Naval Ship Research and Development Center. Six blades were used and the blade motion was pure cycloidal. Two pitch ratios and two steering angles for one of the pitch ratios were investigated over a range of advance coefficients and cavitation numbers.

AD-A016 934/2GA PC$4.25/MF$2.25
California Univ Berkeley Coll of Engineering
Wave-Pattern Measurement Using a Half-Ship Model,
Gerald E. Bellows. Aug 75, 62p Rept no. NA-75-1
Contract N00014-69-A-0200-1023

Descriptors: *Ship hulls, *Ocean waves, Ship models, Model basins, Model tests, Mathematical models.
Identifiers: Wave patterns.

This report contains an investigation of the wave pattern of a half-ship model. Using a 5-foot ship model that has been cut in half along the vertical centerline plane and by towing this half model very close to one wall of the model tank, a wave pattern corresponding to that produced on one side of a symmetric ship model is obtained. The longitudinal-cut method is used to measure the wave pattern. Comparisons of the wave resistance of the half model and whole model are given. It is apparent from these that the results are in agreement for distances from the wall of less than three inches. These results show that the length of a longitudinal cut before reflection occurs can be doubled by using this procedure rather than towing a conventional ship model in the center of the tank. This is especially useful for tests of high-speed hull forms.

AD-A016 935/9GA PC$4.75/MF$2.25
California Univ Berkeley Coll of Engineering
Numerical Calculation of Second-Order Wave Resistance,
Young Suck Hong. Aug 75, 82p Rept no. NA-75-2
Contract N00014-69-A-0200-1023

Descriptors: *Ship hulls, *Ocean waves, Resistance, Equations of motion, Numerical analysis.
Identifiers: *Wave resistance.

The wave resistance due to the steady motion of a ship was formulated in Lagrangian coordinates by Wehausen (16). By introduction of an iteration scheme the solutions for the first order and second order were obtained. The draft/length ratio was assumed small in order to simplify numerical computation. In this work Wehausen's formulas are used to compute the resistance numerically. A few models are selected and the wave resistance is calculated. These results are compared with other methods and experiments. Generally speaking, the second-order wave resistance does show better agreement with measured wave resistance than the first-order theory does. However, the agreement is still not good enough so that computation can replace experiment, and indeed in certain cases the computed values show physically unacceptable behavior.

AD-A016 953/2GA PC$5.25/MF$2.25
Massachusetts Inst of Tech Cambridge Dept of Ocean Engineering
A Numerical Method for Two-Dimensional, Cavitating, Lifting Flows,
Daniel Wilson Golden. May 75, 102p Rept no. TR-81512-1
Contract N00014-67-A-0204-0083

Descriptors: *Hydrofoils, *Cavitation, Two dimensional flow, Lift, Lifting surfaces, Angle of attack, Boundary value problems, Numerical methods and procedures, Computer programs, FORTRAN.
Identifiers: *Cavitating flow, Lifting flow, FORTRAN 4 programming language.

A numerical method for two-dimensional cavitating flow is developed for the flat plate. The linearized boundary value problem is restated as a set of coupled integral equations. The integral equations are approximated numerically. The numerical approximation is executed by a Fortran 4 computer program. The computed results are compared to the analytic solution. This method should provide insight into developing a method for three-dimensional cavitating flows and is readily extendable to cambered profiles.

AD-A016 969/8GA PC$6.25/MF$2.25
California Univ Berkeley Hydraulic Engineering Lab
Effect of Large Nearshore Structures on Wave Motion in the Vicinity of the Structure and Adjacent Coast.
Technical rept.,
Volker W. Harms, Ho Tak Sun, R. L. Wiegel, and Manssour A. Kian. Jan 74, 154p Rept no. HEL-1-22
Contract DACW72-72-C-0030

Descriptors: *Structures, *Offshore, *Ocean waves, Littoral drift, Erosion, Diffraction analysis, Breakwaters, Computer programs.
Identifiers: *Offshore structures, *Littoral transport, *Scouring.

This report deals with the diffraction of water waves by large impermeable offshore structures. It presents the first phase of a laboratory study of the diffraction of uniform periodic waves by rigid, impervious, vertical-wall offshore structures. The laboratory tests were evaluated in view of an extension of existing diffraction theory using an available, modified computer program (Fan, Cumming, and Wiegel, 1967). In addition, some studies were made of the effect of wave energy absorbing material placed on the seaward side of laboratory breakwater models.

COM-75-11431/4GA PC$3.75/MF$2.25
National Maritime Research Center-Kings Point, N.Y.
Economic Comparison of Various Marine Power Plants - 1974.
Final rept.,
Jose Femenia. Aug 75, 41p NMRC-KP-146 MA-RD-900-76013
Prepared by Webb Inst. of Naval Architecture, Glen Cove, N.Y. Center for Maritime Studies Contract MA-2-4230.

Descriptors: *Marine engines, *Economic analysis, Diesel engines, Gas turbine engines, Steam engines, Fuels, Maintenance, Expenses, Cost comparison, Operating costs.

This report gives comparative annual operating costs (including capital charges) for a number of types of marine power plants over the range of 10,000 to 50,000 SHP (single screw). Included are two and four-heater steam, reheat steam, Diesel, gas turbine and combined cycle plants. Results are intended to give marine engineers, naval architects, and managerial personnel easily useable data for estimating comparative costs of various marine power plants.

PATENT-3 838 643 Not available NTIS
Department of the Navy Washington D C
Explosive Device for Scuttling Ships.
Patent,
Carl F. Austin, and Carl C. Halsey. Filed 4 Oct 71, patented 1 Oct 74, 5p Rept nos. PAT-APPL-186 389,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Ships, *Sinking, *Explosive charges, *Patents, Shaped charges, Containers, Frangible, Fastenings.
Identifiers: PAT-CL-102-24-HC, Ship scuttling, Linear charges.

The patent relates to an explosive device comprising a linear charge in the shape of a hollow square confined between a metallic liner and a frangible non-metallic housing which breaks into small, non-lethal parts when the device is exploded, and means for detonating the charge at diagonal corners of the square. The method involves affixing the device to the interior wall of a ships hull and detonating it.

PB-245 922/0GA PC$5.25/MF$2.25
Washington Univ., Seattle. Dept. of Mechanical Engineering.
An Analysis of Ship Resistance.
Final rept.,
Bruce H. Adee, and Philip J. Harvey. Mar 75, 116p UWME-BHA-75-01
Grant NSF-GK-37430

Descriptors: *Ship hulls, *Drag, Hydrodynamics, Mathematical prediction, Computerized simulation, Turbulent boundary layer, Theories, Shear properties, Friction, Water waves, Mathematical models, Fluid dynamics.
Identifiers: Ship resistance.

The research conducted under this grant has been concerned with the development of a computational scheme for theoretically predicting a ship's resistance. The computation is divided into two portions. First, the fluid flow is calculated under the assumption of an inviscid fluid by finding a hull-surface singularity distribution which satisfies the linearized free-sur-

face and all the other boundary conditions. A set of hull-surface streamlines are generated and a wave resistance is computed based on this hull-surface singularity distribution. The development of the three-dimensional turbulent boundary layer and the shear stress at the hull surface are then found using the streamlines as input. Frictional resistance is evaluated by integrating the shear stress over the hull surface. The sum of the frictional and wave resistance yields the predicted total resistance of the ship.

PB-246 074/9GA PC$2.00/MF$2.25
Transportation Research Board, Washington, D.C.
Inland Waterway Transportation,
Gary M. Broemser. 1975, 40p* TRB/TRR-545, ISBN-0-309-02450-1

Descriptors: *Waterway transportation, *Inland waterways, Energy conservation, Economic factors, Lighters(Boats), Great Lakes, Commerce, Tennessee River, Planning.
Identifiers: Seabee barges, Lighter aboard ships.

Contents:
- Role of waterways in the Nation's transportation system;
- Economic policy of waterway transportation;
- Transportation on inland waterways;
- Internal and external shipping on the Great Lakes;
- Multipurpose projects on the Tennessee River;
- Maintaining the Nation's Waterways;
- Waterways as a system for operations and planning;
- Personnel development for inland waterways.

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A016 609/0GA PC$4.25/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
Development of a Wobble Plate Slurry Pump.
Master's thesis,
Gary L. Smith. 9 May 75, 74p Rept no. TN-75-153
Contract N00017-73-C-1418

Descriptors: *Solid wastes, *Slurries, *Pumps, Impellers, Grinding, Pump components, Shredding, Theses.
Identifiers: *Wobble plates, *Wobble plate pumps, Design criteria, Agricultural wastes, Sewage.

Conventional pumps are inappropriate for slurry transport because of the solids which wrap or accumulate into masses. If efficiency is to be maximized, pumps must be designed for unrestricted passage of the solids material they are to transport. The objectives of this research were to analytically predict the performance of a scaled up experimental wobble plate pump and compare this design with the performance of the experimental wobble shredder pump. An experimental analysis was made to determine the effect of changing the angle of the wobble plate and the capability of the pump to transport slurry material. A wobble shredder pump reported herein was designed to handle fibrous material and other solids. The research was undertaken especially to solve the problem of transporting sewage, cannery waste, pulp, packing plant waste, and liquid manure.

N75-31462/5GA PC$4.75/MF$2.25
Societe Europeenne de Propulsion, Bordeaux (France).
Tests of Two Qualified Hydrazine Butterfly Valves Expertise des Deux Vannes a Hydrazine Qualifiees dans le Cadre du Contrat 1713/72/HP.
G. Vautre, and J. C. Rigal. 16 Jan 74, 85p SEP-TS/SE-43181/73, ESRO-CR(P)-522
Contract ESTEC-2055/73-HP
Language in French.

Descriptors: *Butterfly valves, *Hydrazines, *Performance tests, *Solenoid valves, Control valves, Displacement measurement, Inspection, Leakage, Stiffness, Surface defects.

For abstract, see STAR 1322

13L. Safety Engineering

COM-75-11449/6GA PC$3.25/MF$2.25
Case Western Reserve Univ., Cleveland, Ohio. Dept. of Systems Engineering.
Benefit-Cost Analysis for Disaster Warning Systems, Summary Report,
Steven O. Rosen, and Yacov Y. Haimes. Jan 75, 22p SED/WRG-75/1
Contract COM-OT-0110
See also report dated Nov 74, COM-75-11450.

Descriptors: *Warning systems, Disasters, Benefit cost analysis, Residential buildings, Unit costs, Hazards, Mathematical models, Radio receivers.

Natural disasters such as floods, hurricanes, and tornadoes threaten the United States each year. Consequently, disaster warning systems can play an important role in mitigating their potential effects. Institutional warning systems deliver emergency messages to government agencies, hospitals, schools, radio and television stations, etc. Home warning systems deliver messages directly to members of the general public. The goal of the study is to develop and use an analytical framework for analyzing the costs and benefits of home warning systems, the costs being measured in terms of Present Value dollars, while the noncommensurable benefits are measured by both total lives saved and Present Value dollars (property damage avoided).

COM-75-11450/4GA PC$7.25/MF$2.25
Case Western Reserve Univ., Cleveland, Ohio. Dept. of Systems Engineering.
Benefit-Cost Analysis for Disaster Home Warning Systems, (Annex to Summary Report),
Steven O. Rosen, and Yacov Y. Haimes. Nov 74, 203p SED/WRG-74/6
Contract COM-OT-0110
See also report dated Jan 75, COM-75-11449.

Descriptors: *Warning systems, Disasters, Benefit cost analysis, Residential buildings, Unit costs, Hazards, Radio receivers, Mathematical models.

No abstract available.

COM-75-50576/8GA Not available NTIS
National Bureau of Standards, Weshington, D.C.
Human Activity Patterns and Injury Severity in Fire Incidents Involving Apparel.
Final rept.,
Laura Baker Buchbinder. Mar 74, 15p
Sponsored in part by The Cotton Foundation, Memphis, Tenn.
Pub. in Jnl. on Fire Flammability/Consumer Product Flammability, v1 p4-18 Mar 74.

Descriptors: *Fires, *Clothing, *Burns(Injuries), Surveys, Pattern recognition, Human behavior, Age, Sex, Correlations, Materials, Fabrics, Flames, Statistical data, Flammable liquids, Recommendations.
Identifiers: Reprints.

Activities preceding an apparel fire accident are identified and related to age, sex, and the severity of burn injury. After age six, activity patterns were strongly related to the victim's sex, with men the primary victims of accidents involving flammable liquids, gases, or high voltage electricity, and women more susceptable to direct flame ignition. The majority of cases studied had burns over less than 20% of the total area of their body. When flammable liquids were involved, there tended to be fewer minor injuries and more moderately serious injuries than in accidents not involving intermediary materials. Age and defensive capability were major factors determining extent of injury, with persons over 65 and those with limited ability suffering more serious injuries than other groups. Included are recommendations for remedial action.

NTIS/PS-75/793/0GA
PC$35.00/MF$25.00
National Technical Information Service, Springfield, Va.
Fire Alarms and Fire Detectors (A Bibliography with Abstracts).
Rept. for 1964-Sep 75,
Edward J. Lehmann. Oct 75, 125p*
Supersedes NTIS/PS-75/133.

Descriptors: *Bibliographies, *Fire detection systems, *Fire alarm systems, *Fire safety, Fire extinguishing agents, Fire prevention, Design, Safety engineering, Abstracts, Reliability, Performance tests.

The cited abstracts describe the design, testing, and evaluation of fire alarm systems and fire detectors. Most of the studies are concerned with civilian building fires. However, aircraft, aerospace, and military systems are also included. (Contains 120 abstracts)

PAT-APPL-483 603/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Inflatable Body and Head Restraint.
Patent Application,
Marvin Scholman. Filed 27 Jun 74, 11p Rept no.

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Survival equipment, *Aviation accidents, *Inflatable structures, Patents, Restraint, Shoulders(Anatomy), Pilots, Flight crews, Bodies, Head(Anatomy), Automatic, Crashes, Loads(Forces).
Identifiers: *Patent applications, PAT-CL-244-122, Shoulder harness.

The patent application concerns a vehicle occupant restraint system which inflates upon impact. The restraint system includes lap and shoulder harnesses which resemble conventional restraint systems in their uninflated state. Upon impact the harnesses inflate as does an additional inflatable bladder which cushions the chest area and minimizes head rotation toward the chest.

PAT-APPL-495 478/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Overheated Journal Bearing Derailment Prevention System.
Patent Application,
John H. Armstrong, and Frank C. Kluge. Filed 7 Aug 74, 17p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Railroad cars, *Journal bearings, *Derailment, Axle shafts, Failure(Mechanics), Prevention, Detectors, Patents, Temperature sensitive elements, Actuation, Braking, Monitoring.
Identifiers: *Patent applications, PAT-CL-246-169, Overheating.

An anti-derailment system is disclosed in the patent application to prevent train derailment due to axle failure resulting from journal bearing overheating. The system includes a thermal sensor to continuously monitor the temperature of the bearing and to activate the brake system when the temperature exceeds a predetermined level. A thermally-responsive element located in the journal bearing adapter physically deforms to activate a power source. The resulting signal initiates an electro-explosive brake line venting mechanism, puncturing and venting the brake line to stop the train. Several configurations of the thermal sensor and the power source are possible.

PAT-APPL-495 480/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Local Derailment Sensor and Brake Actuator System.
Patent Application,
John H. Armstrong, and William W. Wassman.
Filed 7 Aug 74, 19p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Railroad cars, *Derailment, *Detectors, Patents, Journal bearings, Motion, Wheels, Temperature warning systems, Braking, Activation, Actuators.
Identifiers: *Patent applications, PAT-CL-246-169, Motion sensors.

The patent application describes a motion sensor combined with a journal bearing thermal detector which produces an output signal utilized to activate a train's brake system upon detection of a local wheel derailment or excessive bearing temperatures. Wheel impact with the roadbed and/or bearing temperatures exceeding a predetermined value causes the sensor to activate a percussion-initiated power source. The output signal triggers an electroexplosive brake venting mechanism, puncturing and venting the brake line for a full service brake application to stop the train.

PB-245 737/2GA PC$3.75/MF$2.25
National Transportation Safety Board, Washington, D.C. Bureau of Surface Transportation Safety.
Highway Accident Report, Francisco Flores Truck/Pickup Truck with Camper and Trailer Collision, U.S. Route 395, Bishop, California, June 29, 1974.
14 Aug 75, 32p NTSB-HAR-75-5

Descriptors: *Motor vehicle accidents, *Accident investigations, Collision research, Trucks, Trailers, Braking, Failure, Acceleration, Impact, Fires, Death.
Identifiers: DOT/5A, DOT/4DZ/DG.

The report describes and analyzes an accident involving a tractor-semitrailer, loaded with lumber, that experienced loss of braking capability while descending Sherwin Pass, a steep, long grade located along U.S. Route 395. The unit suddenly began to accelerate at a point 5 to 5-1/2 miles from a truck parking area where the driver had stopped to adjust his brakes. It managed to remain on the roadway for an additional 2 to 2-1/2 miles, but, as it was attempting to negotiate a curve, the trailer separated from the tractor and overturned in front of a pickup/camper/trailer traveling in the opposite direction. All seven occupants of the pickup, which burst into flames at impact, died in the accident. The National Transportation Safety Board determines that the probable cause of this accident was the loss of braking which permitted the tractor-semitrailer to run away. The loss of braking effectiveness was caused by the improper adjustment of the brakes by the driver, the selection of too high a gear for descent, and a weight overload of the truck.

13M. Structural Engineering

AD-A016 387/3GA PC$3.25/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
Calculation of the Reinforced Thin-Walled Structures by the Method of Finite Elements (Raschet Podkreplennykh Tonkostennykh Konstruktsii Metodom Konechnogo Elementa),
Yu. I. Ivanov. 30 Sep 75, 15p Rept no. NISC-Trans-3692
Trans. of Tsentralnyi Aerogidrodinamicheskii Institut. Uchenye Zapiski (USSR) v3 n1 p51-60 1972.

Descriptors: *Structures, *Thin walls, *Finite element analysis, Reinforcement(Structures), Panels, Airframes, Fuselages, Translations, USSR.

One variant of the finite element method is presented as applicable for calculations of the reinforced thin-walled structures (flat and curved panels, wings and empennage of different schemes, fuselage sections). The applicability of the method coupled with a computer programming is illustrated by several actual calculations. Theoretical results are compared with experimental data.

AD-A016 540/7GA PC$4.25/MF$2.25
David W Taylor Naval Ship Research and Development Center Bethesda Md
Vibroacoustic Response of Turbulence Excited Thin Rectangular Finite Plates in Heavy and Fluid Media.
Research and development rept.,
Ralph C. Leibowitz. 3 Jun 74, 67p Rept no. DTNSRDC-2976G
Availability: Pub. in Jnl. of Sound and Vibration, v40 n4 p441-495 1975.

Descriptors: *Ship plates, *Turbulent flow, *Hydrodynamics, *Finite element analysis, Vibration, Acoustic waves, Response, Hydrostatic pressure, Damping, Loads(Forces), Thinness, Metal plates, Computations, Computer programs, Frequency, Reprints.
Identifiers: Rectangular plates.

A comparative study is made of various methods for computing the vibroacoustic response of a turbulence excited finite rectangular plate in an infinite rigid baffle. The plate is thin, flat, flexible, and isotropic, simply supported or clamped, and is immersed in either heavy or light fluid media. One of the methods--that of Maestrello--applicable to an air loaded plate is modified to introduce (a) a correction for obtaining the true pressure statistics, (b) a simple procedure for including clamped supports, (c) fluid loading, i.e., added mass, and (d) radiation damping. Numerical computations are made for the vibratory response and the radiated power of a water-loaded plate subject to turbulence excitation. The computations are shown to be valid over the low wavenumber-broad frequency range of interest. Basic turbulence-vibroacoustic relationships, useful in numerical computation, are given for infinite and finite plates in light and heavy fluid media. (Author)

AD-A016 631/4GA PC$8.50/MF$2.25
Stanford Research Inst Menlo Park Calif
Slanting for Combined Nuclear Weapons Effects: Blast-Resistant Design/Analysis with Examples.
Technical summary rept.,
H. L. Murphy, and J. E. Beck. Dec 74, 288p
Contract DAHC20-71-C-0292
Includes Errata dated 22 Oct 75.

Descriptors: *Basements, *Shelters, *Civil defense, Structural engineering, Blast loads, Shock resistance, Nuclear radiation, Thermal radiation, Radiation protection, Fire protection, Fire safety, Fallout shelters, Nuclear explosion damage, Explosion effects, Foundations(Structures), Structural properties, Disasters, Protection, Earthquake resistant structures, Cost estimates.
Identifiers: *Blast resistant structures, Slanted construction, Design.

This report provides corrected, updated, and expanded versions of material published in the latest of a series of feasibility studies (AD's 734 831 and 734 832) on slanting (Design modifications) of basements in new buildings, to provide shelter against combined nuclear weapons effects-- air blast and initial nuclear, thermal, and fallout radiation. These reports were written solely for the guidance of design professionals (architects and engineers), who must design human shelter to be located in a new building basement or other below grade structure (natural or bermed). It is emphasized that protective shelter of the kind contemplated in full slanting-- i.e., to protect against 5-30 psi nuclear air blast and related radiation effects--provides excellent (full) protection against such natural disasters as earthquakes, hurricanes (including cyclones), and tornadoes. Also, such protective shelter provides fire protection that in most aspects exceeds fire codes. In short, full slanted basement shelters more than satisfy requirements for protection against all nautral disasters except floods.

AD-A016 663/7GA PC$4.75/MF$2.25
Agbabian Associates El Segundo Calif
Blast-Resistant Characteristics of State and Local Emergency Operating Centers (EOC's).
Final rept. May 74-Aug 75,
Curtis Lang. Oct 75, 88p Rept no. AA-R-7427-1-3865
Contract DCPA01-74-C-0301

Descriptors: *Civil defense, *Buildings, *Vulnerability, Blast, Nuclear weapons, Dynamic tests, Loads(Forces), Construction, Structural engineering, Disasters.
Identifiers: Emergency preparedness, *EOC(Emergency Operating Centers), *Emergency operating centers.

An extensive review of the literature, an analysis of DCPA's nationwide survey of 64 Emergency Operating Centers (EOCs), and a limited regional (California) survey of EOCs were made to obtain information for compiling a list of contents and characteristics of state and local EOCs and establishing their vulnerability to nuclear and natural disasters. Methods were then derived for reducing the vulnerability of existing EOCs and new EOC construction. Techniques were also formulated for temporary protection in time of crisis. The report is written specifically to assist EOC officials to evaluate and reduce the vulnerability of their respective EOCs. Also included are background information and guidelines for the engineer who will be faced with the detail work of vulnerability reduction for a particular EOC.

AD-A016 912/8GA PC$4.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Protection Against Frost Damage. Part VI: Floors Laid Directly on Ground, with Reduced Foundation Depths (Gulv pa Guennen Med Redusert Fundamenteringsdybde),
Per Torgerson. Oct 75, 53p Rept no. CRREL-TL-486
Draft trans. of mono. Norges Teknisk Naturvitenskapelige Forskningsradutvalg from Sikring mot Teleskader for Frost I Jord, n.p., 1975 p67-93.

Descriptors: *Foundations(Structures), *Floors, *Frost, Construction, Thermal conductivity, Soil mechanics, Thermal properties, Norway, Translations.

Identifiers: *Frozen soils, *Building codes, *Cold weather construction.

This report presents research activities conducted in Norway on floors laid directly on ground, with reduced foundation depths. The Building Code of Norway has recently changed allowing this type of construction, therefore research in special test houses using this type of floor was initiated. This report describes these test houses and presents information on heat flow, floor temperatures, damp-proofing and frost-proofing.

AD-A016 985/4GA PC$3.75/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Numerical Solution Schemes for Highly Nonlinear Static Structural Behavior.
Technical manuscript,
John F. McNamara. Oct 75, 28p Rept no. CERL-TM-M-102
Presented at U.S. Army Numerical Analysis Conference, Philadelphia, Pa., Feb 13-16, 1974.

Descriptors: *Structures, Structural response, Loads(Forces), Cyclic tests, Finite element analysis, Stiffness, Earthquake resistant structures, Nonlinear systems.
Identifiers: *Cyclic loads, *Earthquake engineering.

The feasibility and accuracy of a number of solution schemes for problems of static nonlinear structural response are studied. The structure is modeled by the finite element method, and the nonlinearities are mainly those of material behavior, but large displacement effects are also considered. It is shown that accepted solution approaches do not work as expected in the case of cyclic behavior of the structure around its limit load level. Results from two different finite element structural models are compared with those of an experiment for a simply supported beam undergoing load reversals at its midpoint. This simple example illustrates the numerical problems encountered in analyzing engineering structures under severe lateral loads which initiate failure modes in the structure.

COM-75-11377/9GA PC$5.25/MF$2.25
National Bureau of Standards, Washington, D.C. Office of Housing Technology.
The Demonstration of Experimental Lead Paint Hazard Abatement Methods in Washington, D.C.
Interim rept.,
Thomas H. Boone, Harvey W. Berger, A. Philip Cramp, and Herbert A. Jackson. Jun 75, 106p NBSIR-75-761
Sponsored in part by Department of Housing and Urban Development, Washington, D.C. Policy Development and Research.

Descriptors: *Paints, *Lead inorganic compounds, *Barrier materials, Walls, Paint removers, Building boards, Hazardous materials, Construction materials, Metropolitan areas, District of Columbia.
Identifiers: Lead based paints.

This report describes the first stage of an experimental lead paint hazard abatement program carried out in 30 dwelling units in Washington, D.C. The entire program will ultimately involve the abatement of lead paint hazards in a total of approximately 250 dwelling units located in three or more cities. The procedures, demonstrated in Washington, included: paint removal methods using chemical solvents and a heat producing device; the replacement of components such as windows, doors and wood trim and; the installation of flexible sheet and rigid board barrier materials over existing lead paint on wall.

COM-75-11442/1GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C. Center for Building Technology.
The Buffeting of Tall Structures by Strong Winds.
Building science series,
Emil Simiu, and Daniel W. Lozier. Oct 75, 93p* NBS-BSS-74
Library of Congress Catalog Card no. 75-30727.

Descriptors: *Skyscrapers, *Wind pressure, Gust loads, Lateral pressure, Buffeting, Building codes, Dynamic response, Structural engineering, Computer programs.
Identifiers: *Tall buildings.

Certain shortcomings of current procedures for computing alongwind structural response have been shown to result in unrealistic estimates of tall building behavior under the action of strong winds. Differences between predictions of fluctuating response based on various such procedures may be as high as 200%. In recent years, advances in the state of the art have been made which provide a basis for significantly improved alongwind response predictions. The purpose of the present work is to present a procedure for calculating alongwind response which incorporates and utilizes these advances. The basic structural, meteorological and aerodynamic models employed are described, and expressions for the alongwind deflections and accelerations, consistent with tho_e models, are derived. A computer program is presented for calculating the alongwind response of structures with unusual modal shapes or for which the contribution of the higher modes to the response is significant.

ESDU-75006 PC$122.50
Engineering Sciences Data Unit Ltd., London (England).
Design for Maximum Structural Efficiency. Isotropic Sandwich Panels Under Uniaxial Compression.
Data item.
Jun 75, 21p*
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, Va. 22161.

Descriptors: *Sandwich panels, *Compressive properties, Design, Isotropy, Modulus of elasticity, Shear properties, Loads(Forces), Buckling, Graphic methods, User needs, Great Britain.
Identifiers: ESDU/S, *Engineering design data, Design engineering, Engineering data item packages.

The report provides design charts and procedures for obtaining the sandwich panel of maximum structural efficiency by correct choice of core and face plate thickness and material properties. Typical applications include aircraft wing or tailplane panels, and prefabricated panels for buildings.

ESDU-75011 PC$386.50
Engineering Sciences Data Unit Ltd., London (England).
Fluid Forces on Lattice Structures.
Data item.
Aug 75, 41p*
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, Va. 22161.

Descriptors: *Structures, *Structural members, *Wind pressure, Lattice design, Gust loads, Dynamic loads, Lateral pressure, Fluid flow, Graphic methods, User needs, Great Britain.
Identifiers: ESDU/M, ESDU/A, *Engineering design data, Design engineering, Engineering data item packages.

The report provides data for application in estimating the forces and moments associated with the flow of fluids around lattice structures. Typical application is in the design of lattice structures such as radio masts, pylons, bridge and crane girders, offshore structures, etc.

N75-31225/6GA PC$3.25/MF$2.25
Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
Fire Resistance of Concrete-Filled Steel Columns.
A. Aulik. 1975, 18p NRC/CNR-TT-1806, ISSN-0470-2557
Tran-Transl. into English from Byggmesteren (Norway), No. 9, 1973 p 8-12.

Descriptors: *Columns (Supports), *Concretes, *Steels, *Thermal resistance, Filling, Moisture content, Temperature gradients.
Identifiers: Translations.

For abstract, see STAR 1322

PB-245 990/7GA PC$3.25/MF$2.25
Lehigh Univ., Bethlehem, Pa. Fritz Engineering Lab.
Urban Life and Tall Buildings,
Lynn S. Beedle. Jul 75, 9p LEHIGH/FL/369-168
Grant NSF-ENG74-00503-A01
Pub. as Joint Committee on Planning and Design of Tall Buildings.

Descriptors: *Skyscrapers, *Environmental impacts, *Urban areas, Human factors engineering, Planning, Urban development, Structural design, Design criteria, Esthetics, Quality of life.
Identifiers: *High rise buildings.

The relationship between tall buildings and urban life is more intertwined than one might realize. What counts today is a consideration of the multiple ways that a building serves environmental and functional needs. Present society calls for a new approach that considers not only those who use a building but also those who are affected by it.

PB-245 991/5GA PC$3.25/MF$2.25
Lehigh Univ., Bethlehem, Pa. Fritz Engineering Lab.
Human Economics and the High Rise,
Lynn S. Beedle. Jun 75, 18p LEHIGH/FL/369-170
Grant NSF-ENG74-00503-A01
Pub. as Joint Committee on Planning and Design of Tall Buildings.

Descriptors: *Skyscrapers, *Human factors engineering, *Environmental surveys, Buildings, Urban areas, Organizations, Data acquisition, Planning, Information systems, International relations, Structural design.
Identifiers: *High rise buildings.

Whether or not the environment satisfies human-desires (Human Economics) is an important factor to consider in the light of the large number of high-rise buildings being erected all over the world. With this perspective, the scope and activities of the Joint Committee on Tall Buildings are described, a group that arose out of a need to examine all aspects of the problem in view of the exploding urban population and the urgent need to create a more harmonious urban environment. Progress is most probable when the total system and its interactions are considered and in particular reference to the social needs and cultural background of those being served.

PB-246 117/6GA PC$8.50/MF$2.25
California Univ., Berkeley. Earthquake Engineering Research Center.
Behavior of Reinforced Concrete Deep Beam-Column Subassemblages Under Cyclic Loads,
Onder Kustu. May 75, 255p EERC-73-8
Grant NSF-GK-31883

Descriptors: *Beams(Supports), *Columns(Supports), *Reinforced concrete, *Cyclic loads, Building codes, Earthquake resistant structures, Brittle fracturing, Concrete construction.
Identifiers: *Earthquake engineering.

The results of an experimental program to study the behavior and collapse mechanism of reinforced concrete deep beam-column frames and to evaluate present U.S. code provisions, both with respect to design loads and design details is presented. The behavior and failure modes of half-scale, two story, beam-column subassemblages under cyclic induced lateral displacements and constant axial column loads is investigated. The brittle failure due to an inadequate shear capacity of the column sections is noted. Recommendations to increase the lateral load resistance are presented. An analytical model to predict cyclic force-deflection behavior of beam-column subassemblages is developed. Two analytical hysteresis models associated with flexural and shear deformations of the members are described.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A016 372/5GA PC$5.75/MF$2.25
Advisory Group for Aerospace Research and Development Paris (France)
A Further Review of Current Research Aimed at the Design and Operation of Large Wind Tunnels. (Second Report of the MiniLaWs Working Group).
Final rept.
Sep 75, 127p Rept no. AGARD-AR-83
See also report dated Mar 74, AD-777 639.
NATO furnished.

Descriptors: *Wind tunnels, Mechanical engineering, Structural engineering, Test methods, Simulation, High lift, Vertical takeoff aircraft, Short takeoff aircraft, Transonic characteristics, Problem solving, Aircraft engines, Noise(Sound), Turbulence, Boundary layer transition, NATO.
Identifiers: Design, Recommendations.

The present report is in the nature of a continuation progress report. The emphasis is put on providing comments which explain and review critically progress made on the jobs which are listed in the Programme of Work. Information given in a previous report is not repeated as a rule. It is subdivided into six sections according to the main headings in the Programme of Work. In each of these, progress made in the work is describe first and then comments and recommendations are made.

AD-A016 447/5GA PC$3.25/MF$2.25
National Aviation Facilities Experimental Center Atlantic City N J
Sulfur Oxide Measurement in Aircraft Turbine Engine Exhaust,
Gerald R. Slusher. Sep 75, 15p Rept no. FAA-NA-75-10 FAA-RD-75-101

Descriptors: *Exhaust gases, Sulfur oxides, Aircraft engines, Gas turbines, Air pollution, Jet aircraft, Chemical analysis, Turbofan engines.
Identifiers: *Aircraft exhaust, *Sulfur dioxide, *Sulfur trioxide, Gas sampling, DOT/5C.

A limited investigation was conducted to measure the oxides of sulfur in aircraft turbine engine exhaust. The objective was to establish the ratio of sulfur trioxide (SO3) to sulfur dioxide (SO2) to be used in support of the climatic impact assessment program. The SO3 concentration was found to be 13.8 percent of the SO2 concentration as determined by wet chemistry analysis. Sulfur recovered in the samples was approximately 50 percent of the total sulfur in the fuel.

AD-A016 453/3GA PC$3.75/MF$2.25
Dikewood Corp Albuquerque N Mex
Program Milestones for Near-Term COR.
Final rept.,
Robert L. Stohler. Oct 75, 29p Rept no. DC-TR-1242-2 AFSWC-TR-75-6
Contract F29601-74-C-0022

Descriptors: *Ranges(Facilities), *Management information systems, Scheduling.
Identifiers: Continental operations range.

The report represents a first attempt to define the Near-Term COR (Continental Operations Range) configuration. Assumptions of equipment availability and interaction are presented in a 'PERT' type format to provide visibility for the effort involved. Because the preliminary planning for COR is not complete, and the integration contractor effort has not yet been defined, no specific times could be presented. Equipment configuration was based on support of the EWJT and buildup of a microwave communications systems.

AD-A016 462/4GA PC$4.25/MF$2.25
New Mexico Univ Albuquerque Dept of Mechanical Engineering
Force Transducers for Dual Rail Sleds.
Final rept. 30 Nov 73-30 Jun 75,
William E. Baker. Jul 75, 57p Rept no. ME-65(75) AF-292-1 AFSWC-TR-75-56
Contract F29601-74-C-0025

Descriptors: *Rocket sleds, *Tracks(Aerodynamics), *Transducers, Force(Mechanics), Calibration, Instrumentation, Loads(Forces), Experimental design.
Identifiers: Trackshoes(Suspension devices).

A description of the work undertaken for the two tasks of the contract is given. The first task required the design and development of instrumentation for special force transducers for the narrow gage dual rail sled, and instrumentation of four of these units for use during the sled runs. Two components of force were to be measured, the vertical and cross-track components. The transducer hardware was to be furnished by another agency. Due to delays in fabrication of the hardware, it was possible to complete only the design and development phase work. Recommendations for the final design are given. The second task required design, development, and manufacture of force transducers for measurement of the cross-track forces on a large dual rail sled. The transducers developed for this task are described. These transducers also have the capability of measuring the vertical forces. Results of calibration tests and combined load tests are given, and the documentation shows the units developed meet the specified contract requirements.

AD-A016 472/3GA PC$4.75/MF$2.25
Air Force Materials Lab Wright-Patterson AFB Ohio
Evaluation of Selected Refractories as High Temperature Thermophysical Property Calibration Materials.
Final rept. 1 Jun 72-1 Dec 73,
Merrill L. Minges. Aug 75, 76p Rept no. AFML-TR-74-96

Descriptors: *Thermophysical properties, *Thermal conductivity, *Thermal diffusion, *Standards, Tungsten, Graphite, Stability, Energy transfer.

Two materials, tungsten and an isotropic graphite, were selected out of a list of twenty-two materials for more detailed evaluation on their reliability for being a high temperature thermophysical property reference standard. High temperature thermal property and electrical resistivity measurement results from an expanded international measurement program are presented and compared which involved 18 laboratories, nine in Europe and 9 in the U.S. It was concluded, that the thermal conductivity and thermal diffusivity of the graphite were known within + or - 10% and + or - 6% respectively while for the tungsten the corresponding inaccuracy bounds for both properties were + or - 5%. Specific recommendations are given for further experimental and analytical studies with these two calibration materials.

AD-A016 723/9GA PC$5.25/MF$2.25
Arnold Engineering Development Center Arnold Air Force Station Tenn
Experimental Evaluation of the Aerodynamic Design Criteria and Performance of a Transonic Ludwieg Tube Wind Tunnel.
Final rept. Jul 74-Mar 75,
M. O. Varner, D. W. Stallings, and R. F. Starr.
Oct 75, 110p Rept no. AEDC-TR-75-132
See also report dated Dec 73, AD-771 646.
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn. Rept. no. ARO-VKF-TR-75-82.

Descriptors: *Transonic wind tunnels, *Aerodynamics, Operation, Test facilities, Experimental data, Test methods, Model tests, Mathematical models, Walls, Diffusers, Aerodynamic loading, Flow fields, Reynolds number, Control.
Identifiers: Ludwieg tubes, Flaps(Hinged devices).

This report presents the results of continued studies into the details of the aerodynamic processes which govern the operation of a Ludwieg tube transonic tunnel. Refinements in the configuration of the flow-conditioning channel (nozzle, test section and diffuser), which represent an improvement over a previous design are described. Detailed analyses of the starting process, ejector flap performance, and wall loadings during the starting process are covered. Emphasis has been placed on understanding and describing the fundamental mechanisms which govern the aerodynamic behavior such that meaningful performance estimates can be made for facilities of different size or slightly different configurations.

AD-A016 797/3GA PC$5.75/MF$2.25
General Dynamics San Diego Calif Convair Aerospace Div
Study of Model Aeroelastic Characteristics in the Proposed High Reynolds Number Transonic Wind Tunnel (HIRT) in Reference to the Aeroelastic Nature of the Flight Vehicle.
Final rept. Apr-Dec 73,
R. L. Holt, G. J. Fatta, and S. P. Tyler. Oct 75, 132p Rept no. CASD-AFS-73-008-75 AEDC-TR-75-62
Contract F40600-72-C-0015

Descriptors: *Transonic wind tunnels, *Aeroelasticity, Reynolds number, Wind tunnel models, Model tests, Feasibility studies, Aircraft, Aerodynamic characteristics, Altitude, Twist(Aerodynamics), Test methods, Mathematical models.
Identifiers: High Reynolds number flow.

A high Reynolds number transonic wind tunnel (HIRT) has been needed for some years. The proposed HIRT facility will provide such a tool. The usefulness of the HIRT facility will be largely influenced by the ability of industry to design and build wind tunnel models for an acceptable cost capable of operating within the severe environment of the tunnel. A test plan, which encompasses several critical conditions within the flight envelope, is described for two configurations.

AD-A016 957/3GA PC$3.75/MF$2.25
Denver Research Inst Colo
Cloud Condensation Nucleus Spectrometer.
Final rept.,
V. K. Saxena, and N. Fukuta. Dec 74, 29p Rept no. DRI-2657
Contract N00019-74-C-0220

Descriptors: *Clouds, *Condensation nuclei, *Particles, *Spectrometers, Measuring instruments, Cloud chambers, Drops, Counters, Water vapor, Thermal diffusion, Sampling, Light scattering, Supersaturation, Fog.

The project was initiated to develop and test an instrument capable of measuring the activity spectrum of the cloud condensation nuclei (CCN) by simultaneously simulating a range of supersaturations encountered in cloud or fog formation. The design, fabrication, and testing of such an instrument has been successfully completed. This CCN spectrometer has definite advantages over all the CCN counters presently in use. A range of supersaturations, rather than only one supersaturation, can be produced and sustained at a given point in time. The spectrometer will be used for marine fog measurements.

AD-A016 961/5GA PC$4.75/MF$2.25
Southwest Research Inst San Antonio Tex
Design of a Test Machine for Biaxial Testing of Composite-Laminate Cylinders.
Final rept. May 74-Apr 75,
U. S. Lindholm, A. Nagy, L. M. Yeakley, and W. L. Ko. Jul 75, 83p Rept no. F33616-74-C-0043 AFFDL-TR-75-83

Descriptors: *Test equipment, *Tubes, Laminates, Airframes, Cylinders, Stress testing, Loads(Forces).

A design is presented for a facility to test composite laminate tubes under generalized plane stress loading conditions. The system is designed around multiple closed-loop servo-controlled hydraulic load actuators to provide independent, programmable axial, circumferential and torsional stress to tubular specimens. The unique feature of the design is an actively controlled, hydraulic, collet-type grip. The grip is designed to provide radial displacement of the collet to compensate for deformation in the specimen during loading. This radial compensation is shown to significantly reduce the grip induced constraint stresses which previously have been a serious problem in the testing of composite tubes.

COM-75-50555/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Recent Advances in Residential Smoke Detection.
Final rept.,
Richard G. Bright. Nov 74, 9p
Pub. in Fire Jnl., v68 n6 p69-77 Nov 74.

Descriptors: *Fire detection systems, *Detectors, Performance standards, Ionization, Ionization chambers, Photoelectric cells, Residential buildings.
Identifiers: Reprints, *Smoke detectors.

An early warning fire detection device which shows great promise is the single-station, smoke detector. An increasing number of the U.S. building codes are requiring the installation of single-station smoke detectors in all new housing. There are problems, however, with several of the single-station, smoke detectors on the market. In addition, there is a lack of good published performance standards for these detectors, standards that would improve the quality of smoke detectors offered for sale in the marketplace and would eliminate many of the problems. The National Bureau of Standards, in conjunction with the approvals testing laboratories and the detector manufacturers, is developing performance standards for the single-station, smoke detector. This development is discussed.

COM-75-50559/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Radiographic Nondestructive Testing.
Final rept.,
Harold Berger. Mar 75, 9p
Pub. in Standardization News, v3 n3 p21-29 Mar 75.

Descriptors: *Radiography, *Nondestructive tests, Reviews, Dimensional measurement, Real time operations.
Identifiers: Reprints.

The article is a review of radiographic nondestructive testing for a planned nondestructive testing issue of Standardization News (ASTM). Several new ideas in radiographic methods are described following a brief review of conventional gamma and x-radiography. New ideas discussed include high definition radiography, xeroradiography, electron radiography, image enhancement, real-time systems, three-dimensional methods, neutron radiography, and proton radiography.

COM-75-50560/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Summary/Conference on Emerging Techniques for Nondestructive Field Testing.
Final rept.,
Harold Berger. Jul 75, 3p
Pub. in Materials Evaluation, v33 n7 p189-191 Jul 75.

Descriptors: *Nondestructive tests, Meetings, Pavements, Bridges(Structures), Pipelines, Vehicles, Railroads, Inspection.
Identifiers: Reprints.

The Conference on Emerging Techniques for Nondestructive Field Testing held Aug. 13-14, 1974, at the Transportation Systems Center in Cambridge, Mass., was jointly organized by the American Society for Nondestructive Testing (ASNT) and the U.S. Department of Transportation (DOT). More than 100 persons attended to learn more about the conference theme, 'Opportunities for NDT in Transportation'. A primary purpose of the meeting was to make the NDT community aware of some of the nondestructive testing objectives and problems of DOT, in the expectation that organizations or individuals who had solutions, or potential solutions to such problems would make them available. The meeting itself provided the initial opportunity for this interaction.

COM-75-50567/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Ultrahigh Pressure Diamond-Anvil Cell and Several Semiconductor Phase Transition Pressures in Relation to the Fixed Point Pressure Scale.
Final rept.,
G. J. Piermarini, and S. Block. Aug 75, 7p
Pub. in Review of Scientific Instruments, v46 n8 p973-979 Aug 75.

Descriptors: *Load cells, *Semiconductors, Phase transformations, Pressure, Scale(Ratio), Diamonds.
Identifiers: Reprints.

A diamond-anvil type optical cell of improved design has produced static pressures in gasketed samples up to 500 kilobar as measured by the ruby fluorescence technique. The ruby (R sub 1) line pressure shift is linear to 291 kilobar, and the maximum measured shift is extrapolated to 500 kilobar assuming continued linearity of the pressure dependence. The ultimate pressure capability of this diamond cell has not been established. Transition pressures in the semiconductors Si, ZnSe, ZnS, and GaP measured by the ruby method indicate that the revised 1970 fixed point scale and the ruby (NaCl) scale diverge above 135 kilobar and disagreement may be by as much as a factor of 2 in the 500 kilobar range with the ruby scale defining the lower pressure.

COM-75-50589/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Low-Temperature X-Ray Attachment.
Final rept.,
G. T. Davis, and R. K. Eby. Sep 75, 2p
Pub. in Review of Scientific Instruments, v46 n9 p1285-1286 Sep 75.

Descriptors: *Diffractometers, High vacuum, Revisions, Low temperature research.
Identifiers: Reprints.

A commercial high-temperature, high-vacuum diffractometer attachment, which was originally designed for heating samples from ambient temperatures to 2600K using metal ribbon heaters, has been modified for low-temperature use. This has been accomplished simply by the construction of a new sample holder and a change of the port used for evacuation. With these modifications, controlled temperatures to 100 K can be achieved easily.

COM-75-50599/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
X-Ray Scatter Background Signals in Transmission Radiography.
Final rept.,
J. W. Motz, and C. E. Dick. Oct 75, 9p
Pub. in Med. Phys., v2 n5 p259-267 Sep/Oct 75.

Descriptors: *X ray spectroscopy, *Scintillation counters, Radiography, Electromagnetic scattering, Background noise.
Identifiers: Reprints.

With monoenergetic x-ray beams incident on polystyrene phantoms, the spectra of the transmitted x-rays were measured with a scintillation spectrometer. The scattered and unscattered components of the transmitted x-ray fluence at a point on the beam axis were determined as a function of (1) the incident x-ray energy (18, 22, 32, 49, 58, 69, and 660 keV), (2) the phantom thickness (5.3, 10, and 21 cm), (3) the scatter solid angle determined by the exposed area of the phantom and the separation distance of the image plane (0.090, 0.31, 0.66, 1.8, 3.5, 4.3, 4.8, and 5.1 sr), and (4) the beam diameter at the image plane (25, 17, and 10 cm). The results indicate that, as the incident x-ray energy decreases from 660 to 30 keV, the contribution of the scattered component to the transmitted fluence increases. For typical cases, the data show the effect of the scatter component on the ratio of the image to the background signals. In addition, the examples show that optimum conditions for maximizing this signal ratio may be obtained by a careful selection of the incident x-ray energy for low-, medium-, and high-contrast objects.

COM-75-50626/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Measurement Compatibility and Standard Reference Materials.
Final rept.,
J. Paul Cali, and Connie L. Stanley. 1975, 15p
Pub. in Annual Review of Materials Science, v5 p329-343 1975.

Descriptors: *References(Standards), *Measurement, Compatibility, Availability, Standards.
Identifiers: *Standard Reference Materials, Reprints.

The role of Standard Reference Materials (SRM's) helping to provide measurement compatibility is explored. Measurement compatibility is simply the ability of elements within a measurement infrastructure to achieve same measurement values. It is shown that measurement compatibility results when measurements are made on the basis of accuracy. SRM's are well-characterized materials whose properties are certified on the basis of accuracy. Therefore, laboratories within a measurement infrastructure become compatible when SRM's are used. Sections cover these topics: (a) sources of information concerning the current availability and types of SRM's produced; (b) examples of the impact of SRM's; and (c) a discussion of future directions and needs.

COM-75-50628/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Interlaboratory Evaluation of ASTM E 84-70 Tunnel Test Applied to Floor Coverings.
Final rept.,
T. G. Lee, and Clayton Huggett. 1975, 12p
Sponsored in part by Department of Health, Education, and Welfare, Washington, D.C., and General Services Administration, Washington, D.C.
Pub. in Jnl. of Testing and Evaluation, v3 n1 p3-14 1975.

Descriptors: *Carpets, *Flammability testing, Reproducibility, Performance evaluation, Smoke.
Identifiers: NTISHEWG, Reprints, ASTM E-84 test method.

Results of an interlaboratory evaluation of the ASTM E 84 tunnel test method, involving eleven laboratories and nine materials including four carpets are reported. Data on flame spread, smoke, and fuel contribution were analyzed statistically to determine the reproducibility of the test method. Selected physical characteristics of each tunnel are tabulated and compared relative to specifications in the test method. The causes of higher variability in smoke and fuel contribution measurement between laboratories are not definitely known but may reasonably be attributed to variations in tunnel construction, instrumentation, and operation in different laboratories.

COM-75-50630/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Experimental Observation of Flame Spread Characteristics Over Selected Carpets.
Final rept.,
Takashi Kashiwagi. Dec 74, 23p
Pub. in Jnl. Fire Flammability/Consumer Product Flammability, v1 p367-389 Dec 74.

Descriptors: *Carpets, *Flammability testing, Flux(Rate), Velocity measurement, Ignition, Heat of combustion.
Identifiers: Reprints.

A small laboratory size experiment was used to observe the characteristics of flame spread over various carpets under various constant external radiant fluxes. The results indicate that a minimum radiant flux is necessary to sustain flame spread over carpet surface for the carpets tested. By increasing radiant flux, the flame spread velocity increases sharply and can reach several cm/sec. At a high external radiant flux, preheating time is the controlling factor for flame spread velocity. Ignitability, weight loss, and net heat release rate were also measured under various radiant fluxes. The effect of an underlayment on ignitability, flame spread velocity, weight loss, and net heat release rate, was also observed for various carpets.

COM-75-50635/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
A Calibration Check Service for Paper and Board Test Instruments.
Final rept.,
T. W. Lashof. Jan 74, 1p
Sponsored in part by Technical Association of the Pulp and Paper Industry, Atlanta, Ga.
Pub. in TAPPI, v57 n1 p5 Jan 74.

Descriptors: *Papers, *Wood, *Standards, Tests, Performance evaluation, Calibrating.
Identifiers: Collaborative reference program, Reprints.

A brief editorial description of the NBS-TAPPI Collaborative Reference Program is given, including participants, advantages, methods included, procedure, and related programs.

COM-75-50648/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Vacuum Ultraviolet Radiometry with Hydrogen Arcs. 2: The High Power Arc as an Absolute Standard of Spectral Radiance from 124 nm to 360 nm.
Final rept.,
W. R. Ott, K. Behringer, and G. Gieres. Sep 75, 8p
Sponsored in part by National Aeronautics and Space Administration, Washington, D.C.
Pub. in Applied Optics, v14 n9 p2121-2128 Sep 75.

Descriptors: *Far ultraviolet radiation, *Electric arcs, *Radiometry, Hydrogen, Calibrating, Standards, Plasma diagnostics.
Identifiers: Reprints, *Hydrogen arcs.

A wall-stabilized hydrogen arc can be used as a standard source of spectral radiance since the continuum emission coefficient is calculable to within a few percent. Previous efforts to apply this concept have been impeded by relatively large uncertainties associated with the plasma diagnostics. The present approach yields absolute intensities independent of other radiometric standards or the accuracy of any plasma diagnostics. The hydrogen arc is operated at high temperatures where the continuum emission coefficient reaches a broad, unique, and calculable maximum. Comparisons with other primary standards are consistent with the estimated uncertainty in the arc continuum intensities.

COM-75-50651/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Simple Calibration Procedures for Platinum Resistance Thermometers from 2.5 to 14 K.
Final rept.,
F. L. McCrackin, and S. S. Chang. May 75, 4p
Pub. in Review of Scientific Instruments, v46 n5 p550-553 May 75.

Descriptors: *Resistance thermometers, Calibrating, Platinum, Cryogenics, Liquefied gases, Structural analysis.
Identifiers: *Cryogenic thermometers, Reprints.

Calibration procedures are developed for platinum resistance thermometers in the temperature range 2.5-14 K. Two recommended methods require calibration points at the boiling point of liquid helium (4.215 K) and the triple point of hydrogen (13.81 K); in addition, the first method requires a point at 7.201 K while the second method requires the slope of the calibration curve at 13.81 K. For temperatures from 3.5 to 14 K, the calibrations are accurate to within 0.01 K for the first method and 0.025 K for the second method. For temperatures from 2.5 to 3.5 K, the calibrations are somewhat less accurate. Therefore, if a thermometer has been calibrated for temperatures of 13.81 K and above, its calibration may be easily extended to lower temperatures with sufficient accuracy for many applications. These calibration procedures were developed from two-way structural analysis of the accurate calibrations of 12 platinum resistance thermometers.

COM-75-50654/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
A Performance Standard for Walk-Through Metal Detectors.
Final rept.,
Robert M. Mills. Aug 74, 5p
Sponsored in part by National Inst. of Law Enforcement and Criminal Justice, Washington, D.C.
Pub. in Paper on Proceedings of Carnahan and International Crime Countermeasures Conference (1974), UKY Bulletin 105 p78-82 Aug 74.

Descriptors: *Standards, *Detectors, Metals, Weapons, Magnetic detection.
Identifiers: Reprints, *Metal detectors.

The Law Enforcement Standards Laboratory at the National Bureau of Standards (NBS) is developing performance standards for equipment used in the criminal justice system. They will be promulgated primarily by the National Institute of Law Enforcement and Criminal Justice, Department of Justice. The paper discussed the development of a standard for walk-through metal weapon detectors. The standard contains requirements and test methods for such things as detection performance, effects of walking speed and throughput rate, alarm indicator, controls, stability, ambient and generated magnetic field, and interference with other detectors.

COM-75-50655/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Modernizing Gage Block Calibrations: A Case Study in Measurement Assurance.
Final rept.,
John A. Simpson. 1975, 5p
Pub. in Proceedings of Joint Measurement Conference, Gaithersburg, Md., 12-14 Nov 74, p153-157 1975.

Descriptors: *Measuring instruments, *Calibrating, Measurement.
Identifiers: *Gage blocks, Reprints.

Recently the Optical Physics Division of the National Bureau of Standards was faced with a potentially serious set of problems in the gage block calibration laboratory; labor costs were escalating, metrication threatened to greatly increase the workload, and the system in use (interferometry) did not lend itself to providing a desired Measurement Assurance Program. The introduction of a new system that provides better accuracy, lower cost and the possibility of a MAP was undertaken. The methods used to insure compatibility, maintain performance, and to be economic both for the Bureau and its customers, provide an interesting case study which is applicable to many other situations in metrology.

COM-75-50657/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Picosecond Pulse Research at NBS.
Final rept.,
James R. Andrews, and Robert A. Lawton. 1975, 18p
Pub. in Proceedings of Joint Measurement Conference, Gaithersburg, Md., 12-14 Nov 74, p123-140 1975.

Descriptors: *Electromagnetic pulses, *Electrical measurement, Oscilloscopes, Pulse generators, Pulse transmitters.
Identifiers: Reprints, Pulses, Picoseconds.

A general review of pulse measurement research at the National Bureau of Standards is described which includes work with electrical pulse generators using mechanical switches, avalanche transistors, snap off diodes, tunnel diodes, and laser pulses. Pulse transmission studies which include skin effect, nonuniform dielectric, lossy liquid dielectric and superconductivity are also mentioned together with pulse measurement techniques which include oscillographic techniques and pulse autocorrelation. The interfacing of picosecond pulse measurement instruments with a minicomputer is also described. This has resulted in an Automatic Pulse Measurement System (APMS) which has already been used to measure transmission coefficient S sub 21 of some microwave networks.

JPRS-65860 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
GMKP Marine Gravimeter,
V. O. Bagramyants, K. N. Kozhanov, and A. P. Raynot. 6 Oct 75, 9p
Trans. of Prikladnaya Geofizika (USSR) n67 p146-152 1972.

Descriptors: *Gravimeters, Gravimetric geodesy, Marine geophysics, Measuring instruments, Design, Translations, USSR.

The report contains a description of the results of development of a quartz-spring marine gravimeter designed for detailed gravimetric surveys from surface vessels.

N75-31121/7GA PC$3.25/MF$2.25
European Space Research Organization, Paris (France).
Facilities at the European Space Tribology Laboratory. A User'S Handbook.
Mar 75, 13p ESRO-SP-104

Descriptors: *Friction reduction, *Laboratories, *Mechanical devices, *Test facilities, Data recording, Esro, Handbooks, Thermal cycling tests, Vacuum tests.

For abstract, see STAR 1322

N75-31344/5GA PC$3.25/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A New Broadband Square Law Detector.
M. S. Reid, R. A. Gardner, and C. T. Stelzried. 1 Sep 75, 19p NASA-CR-143459, JPL-TR-32-1599
Contract NAS7-100

Descriptors: *Broadband, *Microwave radiometers, *Signal detectors, Antennas, Circuit diagrams, Deep space network, Equipment specifications, Spacecraft tracking.

For abstract, see STAR 1322

N75-31345/2GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Recording of the Polarographic 'Redox Wave' on a Stationary Electrode by Cyclic Voltammetric Method.
G. Farsang, and L. Tomcsanyi. Sep 75, 12p
NASA-TT-F-16548
Contract NASW-2790
Tran-Transl. Into English from Magy. Kem. Folyoirat (Hungary), V. 72, No. 3, 1966 p 136-139.

Descriptors: *Electrodes, *Polarography, *Voltmeters, Electric current, Potentiometers (Instruments).
Identifiers: Translations.

For abstract, see STAR 1322

N75-31448/4GA PC$5.25/MF$2.25
Santa Clara Univ., Calif.
A Multilevel Control System for the Large Space Telescope.
Final Report, 20 Jan. 1974 - 1 Jul. 1975.
D. D. Siljak, S. K. Sundareshan, and M. B. Vukcevic. 31 Jul 75, 101p NASA-CR-143941
Contract NAS8-27799

Descriptors: *Control equipment, *Large space telescope, *Numerical analysis, *Optimal control, Algorithms, Computer programs, Equations of motion, Feedback control, Mathematical models, Nonlinear equations, Reaction wheels.

For abstract, see STAR 1322

PAT-APPL-580 447/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Positron Probes for Mechanical Fatigue Detection System.
Patent Application,
William H. Holt, and Willis Mock, Jr. Filed 23 May 75, 14p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Probes, *Nondestructive testing, Positrons, Metals, Fatigue, Patents.
Identifiers: PAT-CL-73-104, *Patent applications.

The patent application describes positron-emitting probes that have certain features that facilitate the use of positrons for nondestructive testing of fatigued metals. The features include the use of an unfatigued substrate for supporting the positron-emitting material, electric and/or magnetic fields to concentrate the positrons on the test item, and a thin scintillator window for use with those radioactive materials that emit a positron without emitting a time-correlated gamma photon.

PAT-APPL-586 684/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Two-Way Fluid Meter Pump.
Patent Application,
Bernard Vonnegut. Filed 13 Jun 75, 10p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Flowmeters, *Pumps, Reversible, Liquids, Flow rate, Patents.
Identifiers: Two way flowmeters, *Patent applications, PAT-CL-417-572.

A two-way fluid flow metering pump for accurately measuring the rate of flow of a liquid is disclosed in the patent application. A section of a cylindrical shaft is disposed in a bearing made of metal or a fairly rigid nondeformable plastic. An indentation or notch is made in a shaft section passing an inlet and outlet in the bearing, and liquid is transported by the indentation or notch from the inlet to the outlet, or vice versa, depending upon the direction of shaft rotation. A rubber or soft plastic seal inserted in an opening in the bearing remote from the inlet and outlet deforms and conforms to the shaft indentation at each rotation so that the liquid is not transported past the seal.

PATENT-3 829 768 Not available NTIS
Department of the Navy Washington D C
Superconducting Gradiometer for Measuring First and Second Derivatives of a Magnetic Field.
Patent,
James Nicol, Sidney Shapiro, and Martyn F. Roetter. Filed 4 Sep 73, patented 13 Aug 74, 6p Rept nos. PAT-APPL-394 430,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Gradiometers, *Patents, Superconductors, Coils, Magnetic fields, Magnetometers.
Identifiers: *Magnetic measurement, PAT-CL-324-43-R.

The patent relates to the first and second derivatives of a magnetic field measured by two pairs of spaced superconducting sensing coils. These are aligned along a common axis with the individual coils of each pair connected in electrical opposition so that the net current flowing therethrough is proportional to the gradient of the magnetic field in which these pairs are disposed. Superconducting switches associated with these coils are selectively operated to direct these net currents through a superconducting field coil during mutually exclusive time intervals. The resultant magnetic field is measured by a magnetometer which provides an indication of the average value of the magnetic field gradient and the second derivative thereof.

PATENT-3 831 088 Not available NTIS
Department of the Navy Washington D C
Pulsed Signal Phase Lock Spectral Purity Measuring Apparatus.
Patent,
Eldon L. Ord, and Stinson R. Swyers. Filed 1 Aug 73, patented 20 Aug 74, 5p Rept nos. PAT-APPL-384 775,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Frequency analyzers, *Patents, Spectrum analyzers, Phase locked systems, Frequency, Stability, Pulses.
Identifiers: PAT-CL-324-77-E.

The patent describes apparatus for measuring the spectral purity of a low duty cycle pulsed signal. A continuous wave (CW) reference signal is mixed with the pulsed signal forming an IF signal that is applied to one input of a phase detector. The output of the phase detector is amplified and applied to a sample and hold circuit which compresses the pulse spectrum of the pulse signal under test. After a time delay the sample and hold circuit provides an output to a voltage controlled oscillator which supplies a variable frequency CW signal to a second input of the phase detector to complete a phase locked loop allowing FM sideband detection. The sample and hold circuit output is passed, for example, to wave analyzers or through a threshold detector arranged to drive an indicator.

PB-245 730/7GA PC$4.25/MF$2.25
National Center for Atmospheric Research, Boulder, Colo. Atmospheric Quality and Modification Div.
Error Sensitivity of Fixed- and Variable-Path Lyman-Alpha Hygrometers.
Technical note,
Arden Buck. Aug 75, 51p NCAR-TN/EDD-103
Sponsored by National Science Foundation, Washington, D.C. Office of National Centers and Facilities Operations.

Descriptors: *Hygrometers, Lyman alpha radiation, Far ultraviolet radiation, Calibrating, Resolution, Pressure, Temperature, Tables(Data), Error analysis, Numerical analysis, Humidity, Parametric equations, Absorption spectra.

A Lyman-alpha hygrometer development project, carried out by the author at the Research Systems Facility of NCAR, is now nearing

completion. The present study may have usefulness to other users of Lyman-alpha hygrometers. In addition, the equations developed here can be applied to other absorption devices operating anywhere in the electromagnetic spectrum. The Lyman-alpha absorption hygrometer, operated in a variable-path mode, has the potential of offering both high spatial/temporal resolution and high absolute accuracy in a relatvely simple instrument. In this note, the operation of absorption hygrometers in general is examined, along with some schemes for allowing self-calibration. The effects of various parameter measurement errors on humidity accuracy are calculated for both ideal and practical instruments, and error limits to achieve some arbitrary level of performance are listed.

PB-245 769/5GA PC$3.75/MF$2.25
National Center for Atmospheric Research, Boulder, Colo. Atmospheric Quality and Modification Div.
The NCAR Vertical Wind Tunnel: A Vertical Wind Tunnel for Controlling the Motion and Environment of Atmospheric Particles.
Technical note,
Louis D. Breyfogle, Theodore W. Cannon, and J. Doyne Sartor. Nov 74, 48p NCAR-TN/EDD-102

Descriptors: *Wind tunnels, *Cloud physics, Particles, Temperature control, Humidity control, Electric fields, Velocity, Drops(Liquids), Ice, Test equipment, Limits, Simulation, Environment simulators.
Identifiers: Vertical test tunnels.

The NCAR vertical wind tunnel provides a vertically directed air flow that may be varied to control the vertical motion of particles, or to suspend particles for study. The environmental conditions may be varied over a range of temperature (-25 to +27 deg C), humidity (-45 deg C frost point to saturation at +27 deg C), electric field, and vertical velocity (1.25 cm/sec to 9.5 m/sec). The drop size that can be supported by the vertical flow varies from diameters of about 20 micrometers to about 5 mm. This wide range of variation permits duplication of environmental conditions so that water drops and ice particles and their interactions may be studied in the laboratory under environmental conditions similar to those found in nature.

PB-246 170/5GA PC$8.50/MF$2.25
Federal Council for Science and Technology, Washington, D.C. Committee on Federal Labs.
Special Studies of Measurement Problems. Volume 1. Measuring Research and Development and Grant Administration Programs.
Special rept. no. 3.
Oct 73, 256p
Prepared in cooperation with Civil Service Commission, Washington, D.C., General Accounting Office, Washington, D.C., and Office of Management and Budget, Washington, D.C.

Descriptors: *Performance evaluation, *Laboratories, National government, Productivity, Objectives, Research management, Technology innovation.

The feasibility of measurement of Federal R and D activities was studied. Contents include: Discussion and definition of terms; description of Federal R and D laboratories; characteristics of R and D tasks; and performance evaluation. In addition, the appendix includes: Communications, publications and citation as a measure of performance of research and development by William H. Avery; additional comments on the utilization of generated information as a measure of R and D performance, staff paper, NIH; a review of efforts by economists to measure benefits for research and development by Herbert B. Woolley; and an annotated bibliography on performance evaluation of R and D by Gertrude S. McMurray, containing 31 books, 45 reports and 58 journal articles.

14C. Recording Devices

PAT-APPL-561 956/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Method of and Means for Testing a Tape Record/Playback System.
Patent Application.
G. R. Wallace, W. E. Salter, G. D. Weathers, and S. S. Gussow. Filed 25 Mar 75, 18p NASA-CASE-MFS-22671-2
Contract NAS8-21812
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Noise generators, *Playbacks, *Tape recorders, *Test equipment, Channels (Data transmission), *Patent applications, Product development, Signal distortion.

A test set for communications systems is described which includes a pseudo-noise sequence generator providing a test signal that is fed to a pair of signal channels. The first channel includes a spectrum shaping filter and a conditioning amplifier. The second channel includes a variable delay circuit, a spectrum shaping filter matched to the first filter, and an amplifier. The output of the first channel is applied to the system under test. The output of the system and the output of the second channel are compared to determine the degree of distortion suffered by the test signal due to the communications system.

14D. Reliability

AD-A016 299/0GA PC$7.25/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
A Strength-Stress Interference Model for Time-Varying Probability of Failure and Its Application to an Electromechanical System.
Doctoral thesis,
Paul H. Kurtz. 16 Apr 75, 218p Rept no. TM-75-122
Contract N00017-73-C-1418

Descriptors: *Electromechanical devices, *Reliability, Stresses, Failure, Probability, Mathematical prediction, Mathematical models, Computer applications, Fourier analysis, Theses.
Identifiers: Time varying systems.

In electromechanical systems, failure can be represented as the application of a stress to some component which exceeds the corresponding strength of that component. In general, both the stress and strength will be random variables. Aging, wear and overstress conditions can then be considered as phenomena which cause time variation of either the stress or the strength distribution for a particular failure mechanism. The research presented in this thesis develops probabilistic models for the time variation of stress and strength distributions due to these effects, thus permitting prediction of probability of failure as a function of time without a priori knowledge of system failure statistics.

AD-A016 598/5GA PC$5.25/MF$2.25
Stanford Univ Calif Dept of Statistics
Optimal Design of Reliable Systems.
Technical rept.,
David Allen Butler. 5 May 75, 125p Rept no. TR-169
Contract N00014-75-C-0561

Descriptors: *Reliability, *Statistical analysis, Systems analysis, Redundancy, Random variables, Failure, Probability, Theorems.

Any decision about how to design for a given level of system reliability carries with it cost implications and an obvious consideration in the design of a system is how to optimally allocate the available resources in order to achieve the reliability requirements. This is the type of problem considered in this paper. Specifically this paper will focus upon the problem of how to optimally choose component reliabilities in order to minimize the cost of designing and manufacturing the components subject to a lower bound on the system reliability and upper and lower bounds on the component reliabilities.

AD-A016 599/3GA PC$3.75/MF$2.25
Stanford Univ Calif Dept of Statistics
Importance Measures for Highly Reliable Systems.
Technical rept.,
David A. Butler. 27 May 75, 43p Rept no. TR-170
Contract N00014-75-C-0561

Descriptors: *Reliability, *Statistical analysis, Systems analysis, Optimization, Mathematical models.

It is often desirable to maximize the reliability of a coherent system subject to resource constraints. However, for complex systems a formal optimization may not be feasible. For such systems, an approach which is often taken is to focus the resources on some small subset of components which are hopefully most critical to the system reliability. Such considerations lead to the notion of measures of component importance (re system reliability). These measures may take the form of relative rankings among components or may be absolute measures. Both mathematical and engineering definitions of component importance exist. The mathematical definitions typically have the feature of having desirable mathematical properties. The engineering definitions typically have the advantage of being easily calculated and of requiring a minimum of information. In this paper some mathematical and some engineering measures of component importance are compared. Some results are established which give some guidelines as to when one measure is preferable to the others. These results also make more explicit the underlying assumptions of the various measures.

AD-A016 789/0GA PC$4.25/MF$2.25
Army Materiel Command Texarkana Tex Intern Training Center
Applications of the Autocorrelation Function and Fourier Analysis to Quality Control.
Final rept.,
Harry Branch Tanner. Apr 75, 74p Rept no. USAMC-ITC-02-08-75-020
Report on Maintenance Effectiveness Graduate Engineering Program.

Descriptors: *Quality control, *Fourier analysis, Statistical analysis, Fourier transformation, Autocorrelation, Computer programming, Normal density functions.

This research investigates the feasibility of using Fourier Transform Theory and the autocorrelation function for the purpose of detecting when a process is out-of-control. Two methods are proposed, one using the spectral density of process data and the other using the autocorrelation of the process data. Density functions of the test statistic in each case are derived with the assumption that the process data is normally distributed. The results of simulations ran to verify the derived distributions are given, and comparisons are made between the effectiveness of the two proposed methods and a concentional control chart. The author feels that these methods are of interest to persons concerned with quality control, but should not be applied until more research is performed.

N75-31461/7GA PC$4.75/MF$2.25
General Dynamics/Fort Worth, Tex. Materials Research Lab.
Assessment of Nde Reliability Data.
Technical Report, Jul. - Dec. 1974.
B. G. W. Yee, J. C. Couchman, F. H. Chang, and D. F. Packman. Sep 75, 84p NASA-CR-134834, YHG-6780
Contract NAS3-18907

Descriptors: *Computer programs, *Nondestructive tests, *Reliability analysis, *Statistical analysis, Computer techniques, Data acquisition, Data systems, Dynamic structural analysis.

For abstract, see STAR 1322

N75-31939/2GA PC$10.25/MF$2.25
Forsvarets Teletekniska Lab., Stockholm (Sweden).
Seminar on Reliability Data Banks.
A. Ullman. Nov 73, 381p FTL-A-A16:41
Conf-Proc. Held at Stockholm, 15-17 Oct. 1973.

Descriptors: *Data bases, *Reliability, Quality control, Systems engineering.

For abstract, see STAR 1322

14E. Reprography

AD-A016 693/4GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Instrumentation for Conformable Photomask Lithography.
Journal article,
John Melngailis, Henry I. Smith, and Nikulay Efremow. 6 Mar 75, 4p Rept no. JA-4495 ESD-TR-75-270
Contract F19628-73-C-0002
Availability: Pub. in IEEE Transactions on Electron Devices, p496-498 Jul 75.

Descriptors: *Photomasking, *Lithography, Resolution, Contact printers, Damage, Reproduction, Alignment, Substrates, Photographic processing, Photographic equipment, Instrumentation, Reprints.
Identifiers: *Photolithographic production, Dimensional control, Photoresist profile control, Vacuum frame, Multiple mark alignment.

A vacuum frame and a multiple mask alignment system for conformable photomask lithography are described. These instruments greatly improve the convenience and adaptability of conformable photomask lithography and may permit the advantages of improved resolution, dimensional control, photoresist profile control, and reduced mask damage to be realized in routine photolithographic production. (Author)

AD-A016 856/7GA PC$4.25/MF$2.25
Perkin-Elmer Corp Norwalk Conn Electro-Optical Div
Advanced Low Altitude Panoramic Camera Study.
Final technical rept. Jul 73-Jun 74,
Benne J. Troidle. Aug 75, 54p Rept no. PE-TR-12070 AFAL-TR-75-121
Contract F33615-73-C-1203

Descriptors: *Panoramic cameras, Photographic reconnaissance, Low altitude, Panoramic scanners, Aerial photography, Aerial cameras.

The report describes the results of a study investigating unique concepts to accomplish low altitude panoramic photography. The ultimate goal is to achieve tactical reconnaissance performance equivalent to that achievable today but with a minimal impact on vehicle weight/volume budgets. Two camera systems using quasi-panoramic scan techniques have been modeled and their attendant peculiarities analyzed. Both systems are sized for a 140 degree swath width and a 300 nautical mile flight line at 500 foot altitude. The performance predictions using Modulation Transfer Function techniques are within the guide lines established; i.e. nominally 0.3 milliradian per cycle. One system uses a conventional aerial photographic lens and achieves wide angle coverage by scanning about a vertical axis. The second system uses a unique monocentric lens design to achieve wide angle coverage in a strip camera mode. Since the lens is used in a slit configuration at a fixed field angle, normal degradation attributed to wide angle photography, i.e. distortion and illumination variation are negated.

AD-A016 924/3GA PC$3.75/MF$2.25
Army Engineer Topographic Labs Fort Belvoir Va
Engineer Tests of 2.5X Reduction Printer.
Technical rept. Apr-Oct 74,
Frederick C. Myers. Apr 75, 45p Rept no. ETL-ETR-74-7

Descriptors: *Projection printers, Reduction, Film transport systems, Photographic film, Engineering.

The report covers the results of Engineer Tests on the 2.5X Reduction Printer, fabricated under contract by Latady Instruments, Inc., for production use by the DMA Topographic Center (DMATC). The printer was developed to give DMATC the capability of reducing 6.6-inch wide, high resolution, roll film imagery input to 70mm-wide roll film imagery output, while maintaining high resolution and low distortion. The printer was tested against the approved DMATC technical characteristics using a test belt containing a wide variety of photographic test subjects as inputs, such as low-contrast resolution targets, gray scales, calibrated grids, step wedges, and good quality large-scale imagery. The report concludes that the printer meets all the requirements of the Technical Characteristics, with the exception of resolution. The printer produced an average resolution of 103.5 lines per mm (2:1 TOC contrast), while a minimum of 130 lines per mm (2:1 TOC contrast) was required. The problem of Newton rings on the output film can be reduced by placing tape at the two outside edges of the input glass drum. Total elimination of the Newton ring problem will require a major redesign of the optical system to prevent the scattering of light between the outside surface of the glass input drum and the surface of the input film.

N75-31417/9GA PC$3.75/MF$2.25
Technicolor Graphic Services, Inc., Houston, Tex.
Photographic Image Enhancement and Processing.
H. E. Lockwood. Aug 75, 32p NASA-CR-144429
Contract NAS9-11500

Descriptors: *Image enhancement, *Imaging techniques, *Photographic processing, *Spaceborne photography, Black and white photography, Color photography, Computer techniques, Photographic film.

For abstract, see STAR 1322

N75-31419/5GA PC$4.25/MF$2.25
Department of Transportation, Cambridge, Mass. Transportation Systems Center.
Photographic Film Image Enhancement.
Final Report, Oct. 1971 - Feb. 1975.
J. L. Horner. Jul 75, 53p NASA-CR-143441, DOT-TSC-NASA-75-1
Subm-Sponsored by NASA.

Descriptors: *Color photography, *Photographic film, *Spatial filtering, Apollo applications program, Image enhancement, Lasers, Lens design, Optical data processing.

For abstract, see STAR 1322

N75-31420/3GA PC$3.75/MF$2.25
Technicolor Graphic Services, Inc., Houston, Tex.
Reciprocity Testing of Kodak Film Type So-289 Multispectral Infrared Aerial Film.
H. E. Lockwood. Aug 75, 33p NASA-CR-144427, JSC-09908
Contract NAS9-11500

Descriptors: *Aerial photography, *Apollo soyuz test project, *Multispectral photography, *Photographic film, Graphs (Charts), Photographic emulsions, Tables (Data).

For abstract, see STAR 1322

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

AD-A016 868/2GA PC$3.75/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
Testing and Evaluation of Chemical Weapons.
Final rept.,
Donald O. Egner, and Donald Campbell. Aug 75, 39p Rept no. HEL-TM-21-75

Descriptors: *Chemical ordnance, *Riot control agents, *Nonlethal agents, Test methods, Weapons, Projectors(Ordnance), Grenades, Chemical projectiles, Human factors engineering, Experimental data.

Representative chemical-riot-control-agent dispersing devices were selected and tested to obtain results that could guide further development of the effectiveness models for chemical less-lethal devices. Testing techniques and results obtained are discussed. (Author)

15C. Defense

AD-A017 002/7GA PC$6.25/MF$2.25
Brigham Young Univ Provo Utah Dept of Sociology
Field-Testing of Procedures for Using Home Basement Shelters as Group Shelters (Phase II).
Final rept. 5 Jun 74-29 Feb 76,
John R. Christiansen. Sep 75, 156p
Contract DCPA01-74-C-0305
See also report dated Jan 74, AD-774 146, and AD-A017 003.

Descriptors: *Shelters, *Housing(Dwellings), *Civil defense, Basements, Surveys, Field tests, Attitudes(Psychology), Evacuation, Interviewing, Volunteers, Mail, Questionnaires, Planning, Colorado.
Identifiers: Emergency planning.

During 1974-75, a field-test of home basement sharing programs was conducted in three places in Colorado designated as host areas for Colorado Springs during a crisis evacuation. A total of 4,779 households were contacted by mail and personal interviews. The major results included the following: Most households with suitable basements agreed to use and share the basements during emergencies. Procedures used in using civil defense volunteers were found to be satisfactory. Citizens approved the program of informing them about their homes as shelters. Color Illustration Reproduced in Black and White.

AD-A017 003/5GA PC$7.50/MF$2.25
Brigham Young Univ Provo Utah Dept of Sociology
Field-Testing of Procedures for Using Home Basement Shelters as Group Shelters (Phase II): Appendix.
Final rept. 5 Jun 74-29 Feb 76,
John R. Christiansen. Sep 75, 233p
Contract DCPA01-74-C-0305
See also report dated Sep 75, AD-A017 002.

Descriptors: *Shelters, *Housing(Dwellings), *Civil defense, Basements, Field tests, Surveys, Attitudes(Psychology), Volunteers, Interviewing, Mail, Questionnaires, Colorado, Planning, Data acquisition.
Identifiers: Emergency planning.

The appendix to a preceding volume of the same title contains the documentation and procedures used to obtain information for the home basement sharing plan for emergency shelters in a subject civil defense program in Colorado.

NTIS/PS-75/809/4GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Intrusion and Weapon Detection: Crime Prevention (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
Guy E. Habercom, Jr. Nov 75, 82p*

Descriptors: *Bibliographies, *Ordnance detectors, Crime prevention, Warning systems, Detectors, Monitors, Nuclear materials management, Magnetic detection.
Identifiers: *Burglar alarm systems, *Gun detection, *Safeguards, *Intrusion detection.

Personnel and weapon detection methods are investigated in these Government-sponsored research reports. Metal detection of guns, anti-intrusion devices (e.g. burglar alarms, trip wires, etc.) and nuclear security are among the topics reviewed. The report is divided into two parts. Part 1 contains research in development, for civil use, of personnel and weapon detection systems. Part 2 contains reports relevant to military development which could conceivably be applied to civil use. (Contains 77 abstracts)

15E. Logistics

AD-A016 341/0GA PC$5.25/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
The Feasibility of Developing and Solving a Model to Determine Logair Routing Structures.
Master's thesis,
Philip E. Palmatier, and Gary T. Prescott. Aug 75, 103p Rept no. SLSR-30-75B

Descriptors: *Air logistic support, *Routing, Air transportation, Logistics management, Scheduling, Airlift operations, Linear programming, Computer programs, Theses, FORTRAN.
Identifiers: *Air routes, *Transportation models.

During 1972, interest was generated at the Secretary of the Air Force level for review of the total Air Force Logistics Command (AFLC) LOGAIR system costs. Contract costs for LOGAIR are based upon total air miles flown, which represents 87 percent of the total cost, and landing fees. The purpose of this study was to determine the feasibility of developing and solving a computer model that would determine an optimal LOGAIR route structure using computer systems available to AFLC. A mixed integer distribution model was developed for use with the Honeywell LP6000 Mixed Integer Programming Package on the CREATE system. The model successfully obtained an optimal solution to a small test problem. An optimal LOGAIR route structure was not achieved; however, a feasible solution less than the total air miles presently flown was obtained.

AD-A016 345/1GA PC$5.25/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
A Model for Determining Economic Retention Levels of Expendable Inventory Items.
Master's thesis,
William R. Harris, and Clare D. Heidler. Aug 75, 105p Rept no. SLSR-34-75B

Descriptors: *Inventory control, *Logistics planning, Decision making, Air Force procurement, Expendable, Economics, Cost analysis, Mathematical models, Obsolescence, Theses, Computer programs.
Identifiers: Economic retention level, Sensitivity analysis.

This study proposes a model which could be used by the Air Force Logistics Command (AFLC) to compute economic retention levels for expendable type items managed under the D062 Buy Computation System. The major difference between the proposed model and previous retention level models is in the treatment of storage, obsolescence, and interest costs. Storage cost is applied to the item price when holding costs are computed. Obsolescence and interest costs are applied to the item's net salvage value to represent the opportunity cost incurred when an item is not disposed. A sensitivity analysis shows that the model is relatively sensitive to the storage cost factor and the net salvage factor. The model is relatively insensitive to changes in demand rate and the opportunity cost factor described above.

AD-A016 346/9GA PC$5.75/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
A Comparative Analysis of the Parameters of Economic Price Adjustment Clauses.
Master's thesis,
Joseph R. Scarlett, and Kenneth B. Faulhaber. Aug 75, 148p Rept no. SLSR-35-75B

Descriptors: *Logistics planning, *Contracts, *Air Force procurement, Inflation(Economics), Cost analysis, Mathematical prediction, Weapon systems, Computer programs, Theses.
Identifiers: Prices, *Economic price adjustments.

Economic Price Adjustment (EPA) clauses are frequently used with multiyear contracts. The basic objective of these clauses is to protect the contractor or the government when changes in the prices of the factors of production are greater than anticipated. If the prices paid for the factors of production increase the contractor does not assume the total cost of this price increase. On the other hand, should prices fall below the level anticipated the government shares in the cost savings. There are many varieties of EPA clauses. They differ in the manner in which certain parameters are used in the formation of the clause. There is no standard clause and there are many differing opinions as to the affects of each parameter within the clause. Certain common parameters were selected for analysis and their impacts on the cost behavior of the EPA clause were examined. The authors conclude that while the impact of the parameters seem obvious with a cursory examination this is not always true. The impact of each parameter should be examined closely in conjunction with all of the other parameters used with the EPA clause considered.

AD-A016 389/9GA PC$6.25/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
The Identification of a Precedence Network Associated with Base Level Aircraft Maintenance.
Master's thesis,
Clark D. Hubbard, and Charles R. Lindke. Aug 75, 157p Rept no. SLSR-12-75B

Descriptors: *Jet fighters, *Maintenance, *Scheduling, Maintenance management, Logistics planning, Logistics support, Spare parts, Computerized simulation, Data acquisition, Theses.
Identifiers: *Maintenance Data Collection System, F-4 aircraft, F-4E aircraft.

The objective of this study was to develop a method of identifying precedence networks associated with aircraft maintenance that is more efficient than totally relying on the memory and experience of mechanics in the field. A precedence network is the sequence in which tasks should be performed because of their interdependencies. An example of this type of dependency would be the necessity to repair a fuel cell before refueling an aircraft. This research involved the use of the Logistic Composite Model (L-COM) developed by Headquarters, Air Force Logistics Command and the Rand Corporation, the F-4E data base which had been constructed as part of Headquarters, Tactical Air Command's L-COM Study, and Maintenance Data Collection System records for F-4E aircraft.

AD-A016 394/9GA PC$5.75/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
A Tool Reduction Study for Air Force Civil Engineering Prime Beef Contingency Teams.
Master's thesis,
Wayne D. McDermott, and Thomas F. Wilson. Aug 75, 142p Rept no. SLSR-42-75B

Descriptors: *Air Force planning, *Civil engineering, *Logistics management, Emergencies, Fire prevention, Housing(Dwellings), Maintenance, Construction, Combat support, Logistics planning, Logistics support.
Identifiers: Prime BEEF program.

In 1963, the Air Force Civil Engineering Base Engineer Emergency Force (Prime BEEF) concept was implemented. The Prime BEEF mission is to provide immediate worldwide emergency support to Air Force units, and its members are provided with resources to accomplish this mission. Because resources are continually being reduced throughout all Air Force organizations, the authors investigated the possibility that Contingency-Team tool resources could be reduced to a more efficient level without impairing mission effectiveness. Results obtained by questionnaire indicated that a majority of the population of Contingency-Team members believed that the proposed tool reductions would impair mission effectiveness.

AD-A016 395/6GA PC$4.75/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
An Analysis of the Opinions of Air Force and Defense Supply Agency Property Administrators Concerning Methods to Manage Government Furnished Property.
Master's thesis,
Ernest F. Geipel, and Mark J. Dierlam. Aug 75, 98p Rept no. SLSR-50-75B

Descriptors: *Facilities, *Contracts, *Logistics management, Air Force planning, Management planning and control, Department of Defense, Air Force procurement, Effectiveness, Logistics planning.
Identifiers: Rents.

Congress and the General Accounting Office have charged that the current Department of

Defense policy of supplying contractors with rent-free Government facilities for use on Government contracts is an expensive-to-administer program, filled with ambiguous and shared responsibilities. Studies of the program have identified six major problem areas and two recommended changes. A research team at the Air Force Institute of Technology recommended extensive revision of the Armed Services Procurement Regulation, and the Logistics Management Institute, in two Department of Defense contracted studies, recommended implementation of a policy of rent-across-the-board. To determine the validity of the identified problem areas, the authors surveyed a sample of Defense Supply Agency and Air Force Property Administrators.

AD-A016 444/2GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
An Evaluation of the Navy's Selected Acquisition Reporting System.
Master's thesis,
Lonny Kay McClung. Jun 75, 91p

Descriptors: *Naval procurement, *Weapon systems, *Naval logistics, Costs, Management planning and control, Naval budgets, Logistics management, Department of Defense, Theses.
Identifiers: *SAR(Selected Acquisition Reporting), *Selected acquisition reporting.

The thesis investigates the Selected Acquisition Reporting (SAR) System in order to evaluate its effectiveness. Significant problem areas associated with the SAR and the reporting criteria of DOD Instruction 7000.3 (series) are examined. The major issues included: timeliness of the SAR, Project Manager reporting chain of command, the SAR review process, cost estimating procedures, escalation and cost growth, role of the SAR, project 'optimism,' rewards and pressures associated with project management, Congressional Committee views of the SAR, and the background and history of the SAR.

AD-A016 571/2GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
Provisioning an Aircraft Weapons System.
Master's thesis,
Richard Bray Renner. Sep 75, 76p

Descriptors: *Naval aircraft, *Weapon systems, *Spare parts, *Inventory, *Naval logistics, Logistics management, Military supplies, Mathematical models, Logistics support, Maintenance, Theses.

The research reviews the elements and stages of the provisioning cycle and describes the provisioning model used by the United States Navy Aviation Supply Office to select a repair parts inventory for an operational site supporting a new aircraft weapons system. Using actual item data, a sensitivity analysis of important parameters was conducted. It showed that break-even points and minimal cost points could be determined for supply effectiveness goals, and that there is a direct effect of increases in resupply and repair times on IOL inventory.

AD-A016 575/3GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
Escalation Provisions for Navy Contracts Issues and Choices.
Master's thesis,
Michael G. Sovereign, and Carl R. Jones. May 75, 58p Rept no. NPS-55Zo75051

Descriptors: *Naval procurement, *Contracts, Cost effectiveness, Inflation(Economics), Risk.
Identifiers: *Escalators, Prices.

This paper begins with the identification and exposition of the four major issues involved in escalation for Navy contracts. These issues are: Why is the change in input prices a particular problem for Navy contracts. Why is escalation a good procedure for dealing with the problem. What are the possible side effects of using escalation procedures. and, How is the trade-off between administration cost, accuracy and contractor incentives (moral hazard) reached. For each separate issue as well as for the set of interrelated issues a discussion indicating its general applicability as well as its specific applicability to individual case is given. After the issues discussion the area of implementation of escalation is considered as a series of four questions: What prices should be covered. How should the price changes be measured. When should the measurements be made. and, How should the price changes be compensated. These questions are given general answers in each case and the set of questions as a whole is also considered.

AD-A016 778/3GA PC$4.25/MF$2.25
New Mexico Univ Albuquerque Eric H Wang Civil Engineering Research Facility
Feasibility Study on Design of Self-Erecting Aircraft Shelter.
Final rept.,
Roy L. Johnson. Oct 75, 70p AFWL-TR-75-139
Contract F29601-74-C-0030

Descriptors: *Aircraft, *Shelters, Airmobile operations, Structural mechanics, Hinges, Bending moments, Computer programs.
Identifiers: *Self erecting shelters.

This research examined the feasibility of designing and constructing an airtransportable, self-erecting aircraft shelter. Behavior of the shelter during erection and diserection was studied by field testing a 1/4-scale, segmented arch model of semicircular geometry, and by analyzing the behavior of a circular sugmental prototype structure. Analyses of the structural behavior of the model and prototype were performed using the matrix-displacement method. Large displacements of the structure were accommodated analytically by use of a procedure of incremental displacement followed by an updating of structure geometry. A computer program (BOOTSTRAP) was developed to perform these analyses. Analyses showed that stable configurations of the 1/4-scale semicircular arch were achieved only when a single internal hinge was allowed in the structure. A satisfactory diserection procedure for the full-scale prototype was not achieved.

AD-A016 891/4GA PC$4.25/MF$2.25
Army Procurement Research Office Fort Lee Va
Resources for Performing Procurement Research.
Aug 75, 56p Rept no. APRO-PRG-1
See also AD-A016 892.

Descriptors: *Army procurement, *Army research, *Manuals, Management planning and Control, Information systems, Classification, Matrix displays, Bibliographies, Indexes, Logistics management, Department of Defense.

The term procurement research covers a broad spectrum of systematic problem solving. At one end are the short-range, clearly defined tasks commonly addressed in staff studies. At the other end of the spectrum are the long-range, relatively ambiguous projects which may not produce immediate solutions but are, nonetheless, procurement research. Most procurement research projects fall somewhere on the spectrum loosely defined by these two extremes. The purpose of the resources matrix is to identify in a concise format those procurement areas which have been studied and by whom and also to identify those areas which have not received as much attention. It is to be used as a management guide to procurement research resources, as a substitute for a comprehensive data search in the specific topical areas.

AD-A016 892/2GA PC$4.75/MF$2.25
Army Procurement Research Office Fort Lee Va
A Guide to Sources of Information for Procurement Research.
Aug 75, 90p Rept no. APRO-PRG-2
See also AD-A016 891.

Descriptors: *Army procurement, *Army research, *Directories, Logistics management, Information systems, Data bases, Bibliographies, Data acquisition, Sources, Federal budgets, Cost analysis, Negotiations, Contracts, Life cycles, Weapon systems, Economic analysis, Legislation, Department of Defense.

This guide and its companion guide, 'Resources for Performing Procurement Research,' are recommended as Department of Defense procurement research guides.

AD-A016 919/3GA PC$3.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Specification Preparation Methods--State of the Art.
Final technical rept.,
Edgar S. Neely, Jr. Sep 75, 23p Rept no. CERL-TR-P-46

Descriptors: *Military planning, *Specifications, *Computer applications, Cost analysis, On line systems, Questionnaires, Management planning and control, Management information systems, Logistics, Preparation.

This report presents the state of the art in construction specification preparation methods. Special emphasis is given to computerized preparation systems. The report explains the approach used to identify the current preparation methods, discusses the response and analysis to a Construction Specifications Institute (CSI) membership state-of-the-art survey, compares computerized preparation systems, presents the results from a cost analysis study, and summarizes the results and conclusions and makes recommendations.

AD-A016 952/4GA PC$5.25/MF$2.25
National Materials Advisory Board (Nas-Nae) Washington D C
The Effectiveness of the Army Technical Data Package in Technology Transfer for Procurement.
Final rept.
Aug 75, 101p Rept no. NMAB-325
Contract DAAA25-74-C-0383
Report of the Committee on Technology Transfer via the Technical Data Package.

Descriptors: *Government procurement, Information, Packaging, Costs, Contracts.
Identifiers: *Technology transfer, Technical data packages.

A study was conducted to assess the adequacy and effectiveness of the Army's use of the Technical Data Package (TDP) in the transfer of technology from a developer to a new contractor for volume production. A selected TDP from each of five of the Army Commands was examined; four were considered effective, the fifth was considered inadequate. The Committee finds that the Army has used the TDP effectively in procurement but the small percentage of difficulties represents a significant sum in volume procurement. Nine categories of problem areas were identified and alternative procedures are suggested.

15F. Nuclear Warfare

AD-A016 845/0GA PC$3.25/MF$2.25
National Military Command System Support Center Washington D C
The NMCSSC QUICK-Reacting General War Gaming System (QUICK) Program Main-

tenance Manual. Volume 1. Data Assembly Subsystem. Change 1.
Computer system manual,
Richard L. Page, Mark R. Dambro, A. M. Pellicciotto, Paul D. Flanagan, and James McCollough. 1 Jun 74, 14p Rept no. NMCSSC-CSM-MM-9-74-Vol-1-1
Change to Volume 1, Part 1 dated 1 Jun 74, AD-A009 323.

Descriptors: *War games, *Nuclear warfare, *Computer programming, Computerized simulation, Mathematical models, Strategic warfare, FORTRAN.
Identifiers: QUICK(Quick Reacting General War Gaming System), Quick reacting general war gaming system.

The NMCSSC Quick-Reacting General War Gaming System (QUICK) is used to generate missile and bomber plans suitable for strategic war gaming, and to simulate execution of the planned events. This is one of five volumes describing the computer programming specifications for the Quick-Reacting General War Gaming System (QUICK). This volume addresses programs of the QUICK Data Assembly Subsystem, and is intended to serve as the basis for program maintenance activities.

N75-31867/5GA PC$3.75/MF$2.25
Institut fuer Naturwissenschaftlich- Technische Trendanalysen, Stohl/Kiel (West Germany).
Scalar Radiation Field of a Neutron-Source in Liquid Nitrogen.
B. Broecker, K. Clausen, P. Johnsen, P. Schneider-kuehnle, and M. Weinert. 1974, 42p BMVG-FBWT-74-12
Subm-Sponsored by Bundesmin. Fuer Verteidigung.
In German; English Summary.

Descriptors: *Liquid nitrogen, *Neutron irradiation, *Neutron sources, *Nuclear weapons, *Radiation distribution, Computer programs, Fluence, Gamma rays, Neutron flux density, Numerical analysis, Radiation dosage.

For abstract, see STAR 1322

N75-31868/3GA PC$3.75/MF$2.25
Institut fuer Naturwissenschaftlich- Technische Trendanalysen, Stohl/Kiel (West Germany).
Scalar Radiation Field of a Neutron-Source in Liquid Air.
B. Broecker, K. Clausen, P. Johnson, P. Schneider-kuehnle, and M. Weinert. 1974, 38p BMVG-FBWT-74-13
Subm-Sponsored by Bundesmin. Fuer Verteidigung.
In German; English Summary.

Descriptors: *Computation, *Nuclear radiation, *Nuclear weapons, *Radiation dosage, Fluence, Gamma rays, Liquid air, Neutron flux density, Radiation distribution.

For abstract, see STAR 1322

15G. Operations, Strategy, and Tactics

AD-A016 357/6GA PC$4.25/MF$2.25
National Guard Bureau (Army) Washington D C
Annual Report (59th) of the Chief, National Guard Bureau for the Fiscal Year 1965.
30 Jun 65, 74p
See also AD-A016 358.

Descriptors: *National Guard, *Joint military activities, Operational readiness, Field army, Air defense, Surface to air missiles, Military operations, Mission profiles, Airmobile operations, Military transportation.
Identifiers: Nike-Hercules, *Air National Guard.

The report reflects the stepped up tempo of National Guard operations that has been underway over the past decade in general, and since the Berlin Crisis of 1961-62 in particular. The major operations recorded include: A continuation of the program of participation in large scale field maneuvers with the active Army and active Air Force; the completion of the program to convert the Army Guard's fixed air defense sites to the NIKE HERCULES weapons system; expansion of the weekend training plan to the extent of our resources, continuation of the joint operation--called GUARDLIFT--in which Air Guard transports lift Army and Air Guardsmen from their home stations to field exercises, and to summer training areas, including Alaska, Hawaii and Puerto Rico; the accomplishments of a major staff operation in formulating a troop list that conforms to the proposed plan to merge the reserve components of the Army.

AD-A016 358/4GA PC$4.25/MF$2.25
National Guard Bureau (Army) Washington D C
Annual Report (60th) of the Chief, National Guard Bureau for the Fiscal Year 1966.
30 Jun 66, 74p
See also AD-A016 357 and AD-A016 359.

Descriptors: *National Guard, *Joint military activities, Military operations, Logistics, Military training, Operational readiness, Airmobile operations, Air defense, Surface to air missiles, Mission profiles.
Identifiers: *Air National Guard.

The report briefly presents the accomplishments of the National Guard and the Air National Guard for the year 1966.

AD-A016 359/2GA PC$4.25/MF$2.25
National Guard Bureau (Army) Washington D C
Annual Report (61st) of the Chief, National Guard Bureau for the Fiscal Year 1967.
30 Jun 67, 71p
See also AD-A016 358 and AD-A016 360.

Descriptors: *National Guard, *Joint military activities, Defense planning, Southeast Asia, Operational readiness, Airlift operations, Mission profiles, Field army, Surface to air missiles, Military training, Military reserves.
Identifiers: *Air National Guard, Nike.

In general, the report reflects the Guard's assigned part in the nation's commitment to the defense of Southeast Asia. It reflects, also, the Guard's state mission in the increasing scale of civil disorder in our cities. On the Army side, units in the Selected Reserve Force (SRF) maintained the mobilization readiness required by their war plans mission. The 14-unit 'Beef Broth' force of the Air Guard maintained its 'ready now' operational status. The remainder of the Air Guard continued in intensive training program, much of which was performed as operational missions in support of the active Air Force.

AD-A016 360/0GA PC$4.75/MF$2.25
National Guard Bureau (Army) Washington D C
Annual Report (62nd) of the Chief, National Guard Bureau for the Fiscal Year 1968.
30 Jun 68, 92p
See also AD-A016 359 and AD-A016 361.

Descriptors: *National Guard, *Joint military activities, Mobilization, Civil disturbances, Combat areas, Combat readiness, Military training, Logistics, Airmobile operations.
Identifiers: *Air National Guard.

The report briefly presents the accomplishments of the National Guard and Air National Guard for the year 1968.

AD-A016 361/8GA PC$4.75/MF$2.25
National Guard Bureau (Army) Washington D C
Annual Report (63rd) of the Chief, National Guard Bureau for the Fiscal Year 1969.
30 Jun 69, 99p
See also AD-A106 360 and AD-A016 362.

Descriptors: *National Guard, *Joint military activities, Military personnel, Mobilization, Logistics, Civil engineering, Civil disturbances, Air defense, Mission profiles.
Identifiers: *Air National Guard.

The report briefly presents the accomplishments of the National Guard and Air National Guard for the year of 1969.

AD-A016 362/6GA PC$5.25/MF$2.25
National Guard Bureau (Army) Washington D C
Annual Report of the Chief, National Guard Bureau for the Fiscal Year 1970.
30 Jun 70, 101p
See also AD-A016 361 and AD-A016 363.

Descriptors: *National Guard, *Joint military activities, Tactical air command, Airmobile operations, Logistics, Civil engineering, Military personnel, Military training, Military reserves.
Identifiers: *Air National Guard.

The report briefly underlines the growing responsibilities of both the Army National Guard and the Air National Guard. The results of those responsibilities and the methods in which the National Guard accepted them and performed its missions are described.

AD-A016 363/4GA PC$5.25/MF$2.25
National Guard Bureau (Army) Washington D C
Annual Report of the Chief, National Guard Bureau for the Fiscal Year 1971.
30 Jun 71, 102p
See also AD-A016 362 and AD-A016 364.

Descriptors: *National Guard, *Joint military activities, Military reserves, Recruiting, Military training, Airlift operations, Mission profiles.
Identifiers: *Air National Guard.

The report briefly presents the accomplishments of the National Guard and the Air National Guard for the year 1971.

AD-A016 364/2GA PC$5.25/MF$2.25
National Guard Bureau (Army) Washington D C
Annual Report (66th) of the Chief, National Guard Bureau for Fiscal Year 1972.
30 Jun 72, 104p
See also AD-A016 363.

Descriptors: *National Guard, *Joint military activities, Operational readiness, Military training, Airmobile operations, Tactical warfare, Air defense, Military personnel, Military reserves.
Identifiers: *Air National Guard.

The report presents the achievements of the National Guard and Air National Guard for the year 1972.

AD-A016 625/6GA PC$5.25/MF$2.25
Stanford Research Inst Menlo Park Calif Naval Warfare Research Center
ONRODA Warfare Scenario.
Research memo.,
J. R. Payne, and J. V. Rowney. Jun 75, 114p
Rept no. NWRC-RM-83
Contract N00014-74-C-0742

Descriptors: *Aircraft carriers, *War games, *Ship defense systems, Fleet exercises, Decision making, Strike warfare, Naval planning, Operational readiness, Antiaircraft defense systems.

The strike warfare scenario presented is purely hypothetical in description of a war between GREY and ORANGE in which BLUE intervenes. GREY is aligned with BLUE while ORANGE is aligned with RED. The purpose of this scenario development is to provide specific decision situations that are based on parameters describing credible forces, geography, environment, and other pertient factors. The scenario is meant to support the ONR Operational Decision Aids (ODA) community in both the development and evaluation of decision aids to assist the Naval Task Force Commander. (Author)

AD-A016 796/5GA PC$3.75/MF$2.25
Naval Weapons Support Center Crane Ind
Assurance Limits for Vulnerable Area,
Jerry Kemp, David Montgomery, and Norman Papke. 1 Aug 75, 50p Rept no. NWSC/CR/RDTR-10

Descriptors: *Kill probabilities, *Vulnerability, *Statistical analysis, Normal density functions, Random variables, Theorems, Monte Carlo method.
Identifiers: Central limit theorem.

Most vulnerable area (A sub v) analyses consider component probability of kill given a hit, P(K/H), to be a point estimate with no variance. This report presents statistical methods for calculating assurance limits for (A sub v) assuming P(K/H)'s are not known with certainty . Normal approximation and Monte Carlo techniques are presented. The accuracy of these techniques is determined analytically for a target with a small number of critical components and extended to a larger number of components by heuristic arguments. The central limit theorem indicated that (A sub v) will be approximately normally distributed. Formulas for necessary calculations are shown.

AD-A016 889/8GA PC$4.25/MF$2.25
Army Materiel Systems Analysis Activity Aberdeen Proving Ground Md
Antitank Covering Fire and Minefield Effectiveness Model,
Thomas A. Romanko. Jun 75, 55p Rept no. AMSAA-TR-131

Descriptors: *Antitank ammunition, *Minefields, Land mines, Antitank weapons, Firepower, Attrition, FORTRAN, Computer programs.
Identifiers: FORTRAN 4 programming language, *Antitank warfare, Scenarios.

The report presents a detailed discussion and documentation of a computerized expected value model designed to quantify the combined and individual attrition effects of an antitank minefield and direct fire antitank weapons. A complete listing of the FORTRAN 4 computer program and a sample case are also provided.

AD-A016 999/5GA PC$4.75/MF$2.25
Army War Coll Carlisle Barracks Pa
A Critical Assessment of Engineer Computer Modeling.
Individual research project,
Donald W. Reeves. 23 May 75, 82p

Descriptors: *Army operations, *Engineers, *Computerized simulation, *War games, Combat support, Logistics support.

The use of computer simulated warfare is widespread throughout the Army planning process. Engineer forces should play a small but important role in these war gaming exercises. Due to the complex and technical nature of programming and interpreting computer results, planners are usually not qualified to determine the full extent of engineer play or it's significance in the printed output. Nevertheless, decisions are being made relative to force structuring and operations which are at least partially derived from this source. This paper allows planners to become more familiar with the engineer strengths and weaknesses of the predominant force structuring computer models. Four such models are addressed in this research paper: ATLAS, CEM, FASTALS, and CASTLE.

JPRS-65750 PC$5.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Air Defense Subunits in Combat.
24 Sep 75, 115p
Trans. of mono. Zenitnye Podrazdeleniya v Boyu, Moscow, 1974 p1-144.

Descriptors: *Antiaircraft defense systems, Tactical aircraft, Helicopters, Reconnaissance, Antiaircraft gunnery, Translations, USSR.

The report contains the basic regulations on the combat actions of an air defense subunit in combat.

16. MISSILE TECHNOLOGY

16D. Missiles

AD-A016 392/3GA PC$7.25/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and Logistics
Impact of External Environmental Factors on Minuteman III Inertial Guidance System (NS-20) Failures.
Master's thesis,
Gerald L. Clemons, and Chris A. Schell. Aug 75, 216p Rept no. SLSR-27-75B

Descriptors: *Surface to surface missiles, *Inertial guidance, *Environmental protection, Solid propellant rocket engines, Guidance computers, Gyroscopes, Failure, Theses, Computer programs.
Identifiers: Minuteman, Minuteman 3 missiles, LGM-30G missiles.

This study is a preliminary search to determine if a relationship exists between Minuteman 3 Guidance System (NS-20) failures and the external environmental factors of temperature, wind speed, wind direction, humidity, and barometric pressure. Multiple regression analysis was used to determine what degree of relationship, if any, existed between NS-20 failures and several combinations of environmental factors. The search was extended to determine whether or not a relationship existed between external environmental factors and the failure of subcomponents of the NS-20, i.e., the Digital Computer Unit (DCU) and the Pendulous Integrating Gyroscopic Assembly (PIGA). Environmental conditions existing at the time of failure and prior to the time of failure were included.

AD-A016 874/0GA PC$3.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Guidance and Control Directorate
Digital Autopilot Sample Rate Selection Based on Control System Requirements.
Technical rept.,
Edward E. Herbert. 1 May 75, 12p Rept no. RG-75-48

Descriptors: *Automatic pilots, Digital systems, Microcomputers, Digital computers, Stability, Compensation, Sampling, Rates, Control theory, Guided missiles.

The purpose of this paper is to discuss some considerations in the selection of a sample rate for the digital autopilot. The missile autopilot design which incorporates a digital computer or microprocessor(s) to implement the stability compensation equations requires considerations over and above those made for analog computer autopilots. Some of these considerations are: the selection of sampling frequency, the A/D converter wordlength, the phase lag contributed by the zero order data hold (i.e., the A/D converter), the transport lag in the digital computer, and the effects of sampling high frequency sensor and structural (bending) noise (foldover or aliasing). (Author)

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A016 310/5GA PC$3.25/MF$2.25
Scripps Institution of Oceanography San Diego Calif Marine Physical Lab
Long-Aperture Parametric Receiving Arrays.
Summary rept.,
Robert N. McDonough. 27 Jan 75, 8p Rept no. MPL-U-48/74
Contract N00014-69-A-0200-6002
Availability: Pub. in Jnl. Acoustical Society of America, v57 n5 p1150-1155 May 75.

Descriptors: *Passive sonar, *Sonar arrays, *Parametric devices, Underwater sound, Signal processing, Apertures, Acoustic signals, Interactions, Transducers, Low frequency, Reprints.
Identifiers: Design.

The nonlinear interaction of a strong high-frequency local sound source with a weak low-frequency sound signal can be used to construct a system (parametric receiving array) for passive reception of the signal. Analytic formulas exist which describe the behavior of such a system. In this note, we develop a design procedure using these formulas, which leads to optimal system parameters. The procedure is illustrated by the design of parametric arrays for the reception of underwater sound signals in the 25-100-Hz band. Beamwidths of the order of 15 deg seem feasible, while beamwidths as narrow as 5 deg are probably not feasible. Such an array could be deployed in water without the necessity of phasing sensors along the (necessarily long) aperture. (Author)

AD-A016 840/1GA PC$3.75/MF$2.25
Scientific Research Associates Inc Rockville Md
Iterated Low-Pass Filters for Towed Arrays.
Technical rept.,
Albert A. Hudimac. 27 Dec 74, 41p Rept no. 74-5
Contract N00014-70-C-0378
Report on Propagation in Stratified Media.

Descriptors: *Towed arrays, *Vibration isolators, Towing cables, Damping, Mechanical waves, Low pass filters, Mechanical properties, Mechanics.

The vibration-isolation module in a towed array system is replaced first by a classical low-pass filter made up of alternate lumped masses and springs. This iterated filter is modified (usually resulting in combinations of passing bands and rejection bands) by: (1) replacing the lumped springs (which may be ruled out by other constraints) by short lengths of cable, (2) replacing the lumped mass by a 'dynamic mass' (to lower the cutoff frequency), (3) alternating short mismatched cables. The cutoff frequencies, bandwidths and maximum attenuations are compared. Combinations are suggested.

PATENT-3 827 022 Not available NTIS
Department of the Navy Washington D C
Induced Doppler Sonar.
Patent,

Group 17A—Acoustic Detection

Newell O. Booth. Filed 23 Apr 73, patented 30 Jul 74, 8p Rept nos. PAT-APPL-353 263,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Doppler sonar, *Patents, Electroacoustic transducers, Signal processing, Doppler effect, Band pass filters, Narrowband.
Identifiers: PAT-CL-340-3-R.

The patent describes an object bearing detection system comprising of broad-band transmitting electroacoustic transducer and a similar broad-band receiving electroacoustic transducer. The two electroacoustic transducers are combined in an active ranging system such that the transducer is responsible to echo returns from signals produced by the transmitting transducer. The electrical output from the receiving transducer is processed by a plurality of narrow-band filters to obtain bearing information from the returned signals as a function of the Doppler shift of the signals.

PATENT-3 829 596 Not available NTIS
Department of the Navy Washington D C
Sonar Reverberation Simulator.
Patent,
Francis J. Murphree. Filed 26 Jul 73, patented 13 Aug 74, 14p Rept nos. PAT-APPL-383 013,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Training devices, *Simulators, *Patents, Sonar signals, Reverberation.
Identifiers: PAT-CL-35-10-4.

The invention relates to the field of training by way of simulation devices and more particularly to the simulation of sonar signals and associated echoes to teach recognition of the actual target from reverberation effects of scatterers at different distances.

17B. Communication

AD-A016 319/6GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Some Speaker-Identifying Features Based on Formant Tracks.
Progress rept.,
Ursula G. Goldstein. 1975, 15p
Contract N00014-67-A-0204-0069
Availability: Pub. in Progress Report No. 116, P211-223 1975, AD-A015 515.

Descriptors: *Speech analysis, *Speech recognition, Computer applications, Signal processing, Phonetics, Vowels, Acoustic recording systems, Personnel, Speech, Identification systems, Validation, English language, Males, Automatic, Mathematical prediction, Digital computers, Reprints.
Identifiers: *Speaker identification, Formants, Diphthongs, Consonants, PDP 9 computers.

This study investigates formant trajectories of some diphthongs, tense vowels, and retroflex sounds in 3 phonetic environments in order to find and evaluate statistically features that could be relevant to speaker identification. Ten adult male speakers to American English were chosen to make recordings of the sounds to be studied. Recordings were processed semiautomatically using linear prediction analysis on a PDP-9 computer specially set up for speech analysis. An effort was made to identify the most effective features, and to compare the results with previous work. (Author)

AD-A016 339/4GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
A Systems Analysis of the Naval Environmental Data Network (NEDN).
Master's thesis,
Stuart Anderson Merriken. Sep 75, 75p

Descriptors: *Weather communications, *Communications networks, *Data transmission systems, Systems analysis, Costs, Communication terminals, Cost effectiveness, Theses, Intelligence, Naval equipment.
Identifiers: NEDN(Naval Environmental Data Network), Naval environmental data network, NIDN(Naval Intelligence Data Network), Naval intelligence data network, *Computer networks.

The thesis is a study of the Naval Environmental Data Network (NEDN). The objective of the thesis is to conduct a system analysis of the NEDN to establish a basis for designing or redesigning a better, more cost effective network. Emphasis is placed on communication costs. The study is in two parts. The first part describes the existing system, the Naval Intelligence Data Network ((NIDN) which affects the NEDN, the proposed NEDN/NIDN communication terminal, and other networks which are used for comparative purposes. The second part analyzes the NEDN to establish ways to improve the system. The overall conclusion is that cost effective improvements can be made, in particular, reduction of line communication costs. Specific recommendations for improvements are offered.

AD-A016 400/4GA PC$8.50/MF$2.25
IIT Research Inst Annapolis Md
Communications/Electronics Receiver Performance Degradation Handbook (Second Edition).
Final rept.,
Frank Kravitz, and Michael Lemke. Aug 75, 252p ESD-TR-75-013
Contract F19628-75-C-0002
Supersedes rept. no. ESD-TR-73-014, AD-764 710.

Descriptors: *Radio receivers, Reliability(Electronics), Electromagnetic compatibility, Handbooks, Degradation, Signal to noise ratio, Radiofrequency interference.

The revised Receiver Performance Degradation Handbook provides reference curves for determining receiver performance as a function of input signal-to-interference ratio. The performance degradation curves were obtained using both measured data and simulation models. The desired-signal modulation types considered are A1, A2, A3, A3J, A5C, A7J, A9B, F1, F3, F9 and P9. The interference modulation types are A1, A3, A3J, A5C, A9B, F1, F3, F9, P0 and noise. This version supersedes ESD-TR-73-014, published in June 1973.

AD-A016 402/0GA PC$5.75/MF$2.25
Mitre Corp Bedford Mass
Characterization of the Digital High-Speed AUTOVON Channel.
Final rept.,
Kenneth Brayer. Aug 75, 132p Rept no. MTR-2968 ESD-TR-75-80
Contract F19628-75-C-0001

Descriptors: *Telephone systems, *Data transmission systems, Digital systems, Errors, Data rate, Markov processes, Mathematical models.
Identifiers: Markov chains.

AUTOVON, a voice telephone communication system available to U. S. Government agencies, can be used for the transmission of high-speed digital data. The performance of AUTOVON in passing 4800 b/s and 9600 b/s digital data is evaluated in terms of the residual channel error distributions associated with the use of the state-of-the-art Codex 9600 modem. It is demonstrated that the channel is a burst error channel and will support data transmission with bit error rates in the order of 0.0001 to 0.00001. In addition, channel models are presented that can be used to predict the performance and design of error-detecting/correcting codes.

AD-A016 477/2GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Measurement of ELF Noise Processing.
Technical note,
Andrew S. Griffiths. 2 Sep 75, 69p Rept no. TN-1975-33 ESD-TR-75-171
Contract F19628-76-C-0002

Descriptors: *Noise(Electrical and Electromagnetic), Communication and radio systems, Extremely low frequency, Processing, Radio receivers, Nonlinear systems, Level(Quantity).

The report describes non-linear processing experiments with ELF noise recorded in Norway, Saipan, and Greece. Effective noise levels, an important measure of performance for a non-linear receiver, were computed using sine-wave signals in the 42-48 Hz and 72-78 Hz bands. Although results were not optimum due to fixed (as opposed to adaptive) clip levels, notch filter effects and local sine-waves interference, they do show diurnal variations and do provide a significant increase in the available data in this frequency range.

AD-A016 480/8GA PC$3.75/MF$2.25
Air Force Avionics Lab Wright-Patterson AFB Ohio
Electronic Sensor Package and Data Transmission System for Project 'Teleplane'.
Final rept. 3 Jan-31 Jul 74,
Kenneth E. Ayers. Aug 75, 37p Rept no. AFAL-TR-74-252

Descriptors: *Data transmission systems, *Remotely piloted vehicles, Downlink, Detectors, Ground stations, Altimeters, Temperature, Rotation, Multiplexing, Analog to digital converters.

A functional and detailed description is given of an electronic data system to be used in a Remotely-Piloted-Vehicle (RPV) test environment. It includes descriptions of a basic electronic sensor package; a digital data transmission system and its signal structure; and an associated receiving/decoding scheme.

AD-A016 489/7GA PC$3.75/MF$2.25
Mitre Corp Bedford Mass
An Outline of the Applications Software for the RIDS Experimental TDM Bus.
P. R. Cloud. Sep 75, 36p Rept no. MTR-3015 ESD-TR-75-78
Contract F19628-75-C-0001

Descriptors: *Interequipment communication, *Data transmission systems, *Time division multiplexing, Avionics, Bus conductors, Computer programming, Signal processing, Intercommunication systems.
Identifiers: RIDS(Radio Information Distribution Systems), Radio Information distribution systems, AN/ARC-50.

Under the Radio Information Distribution System (RIDS) project a rudimentary experimental TDM bus was built that is compatible with the constraints of MIL-STD-1553 (USAF). The report outlines the applications software generated in support of a demonstration of some of the bus capabilities. These included the servicing of an AN/ARC-50 UHF radio and an array of cockpit indicators, initiation of visual and audible warnings based on the values of the parameters being monitored and displayed, and the generation of fault diagnostic displays when an operator makes an illegal switch setting.

AD-A016 494/7GA MF$2.25
Rand Corp Santa Monica Calif
Media for Satellite Communication,
Rudy Bretz. Feb 75, 21p Rept no. P-5381
Availability: Paper copy available from the Rand Corp., Santa Monica, CA. 90406, $1.50.

Descriptors: *Satellite communications, Media, Classification.

There are at least 30 separate and distinguishable communication media and multi-media combinations in use, or at least demonstratable today, that can be transmitted between earth and satellite, and back again. In this sense 'medium' includes a means of originating messages, incorporated into programs where appropriate, encoding-transmitting-decoding, and displaying these messages to their intended receivers. If it is a live medium, this all happens in apparent simultaneity. These 30 media are listed in eight classes and discussed.

AD-A016 527/4GA PC$4.25/MF$2.25
Pacific Sierra Research Corp Santa Monica Calif
VLF/LF TE-Mode Propagation under Disturbed Ionospheric Conditions.
Final rept. 1 May-30 Jun 75,
Edward C. Field, and Michael A. Dore. Jul 75, 58p Rept no. PSR-504 AFCRL-TR-75-0382
Contract F19628-75-C-0181

Descriptors: *Radio transmission, Very low frequency, Low frequency, Strategic communications, Transverse waves, Attenuation, Ionospheric disturbances, Field intensity, Nuclear explosions, Ionospheric models, Electromagnetic wave propagation, Ionospheric propagation.
Identifiers: Atmospheric attenuation.

The report compares calculated attenuation rates for transverse magnetic (TM) and transverse electric (TE) modes propagating in the earth-ionosphere waveguide. Frequencies from 10 to 50 kHz are considered, and attention is restricted to situations where the fields can be represented in terms of the least-attenuated TM or TE mode. Nine model ionospheres corresponding to conditions caused by widespread high-altitude fission debris are used as inputs to the calculations. Certain of these models are also representative of polar-cap-absorption (PCA) events. The calculations utilize full-wave methods, and account for the vertical inhomogeneity of the ionosphere, the effects of heavy ions, and the curvature of the earth. In addition to the modal attenuation rates, results are given for field-strength height-profiles, plane-wave ionospheric reflection coefficients, and the relative importance of heavy ions vis-a-vis electrons.

AD-A016 562/1GA PC$4.25/MF$2.25
American Nucleonics Corp Woodland Hills Calif
LF Field Measurements and Noise Suppression.
Final rept. 15 Oct 74-30 Jun 75,
Walter A. Sauter, and Rabindra N. Ghose. 1 Jul 75, 51p Rept no. ANC-1051-R1 AFCRL-TR-75-0369
Contract F19628-75-C-0028

Descriptors: *Radio transmission, *Noise(Electrical and electromagnetic), Low frequency, Suppression, Radiofrequency interference, Cancellation, Field intensity, Transverse waves, Air to air, Harmonics.

Requirements toward the measurement of LF fields at TE and TM modes originating from a trailing wire antenna and received at a distant aircraft including means to suppress noise to permit discernibility of signals, are reported herein. Comparative field tests for the TE and TM modes indicate that the air-to-air long-range LF communication effectiveness can be significantly improved if the TE mode field is utilized at the receiver. The advantages obtainable from the TE mode field, however, cannot be fully realized unless the noise at the receiving antenna is suppressed from its normal level. Means to suppress 400 Hz harmonic noise, in general, and the use of the interference cancellation system in particular including experimental verification of its potential advantages, are outlined in the report.

AD-A016 614/0GA PC$3.75/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
Interface Message Processors for the ARPA Computer Network.
Quarterly technical rept. no. 3, 1 Jul-30 Sep 75,
Frank E. Heart. Oct 75, 32p Rept no. BBN-3182
Contract F08606-75-C-0032, ARPA Order-2351

Descriptors: *Message processing, *Communication switching centers, *Communication satellites, *Networks, *Data processing terminals, Interfaces, Secure communications, Debugging(Computers), Subroutines.
Identifiers: Computer networks, Tempest security, Computer software.

The ARPA computer network is a packet-switching store-and-forward communications system designed for use by computers and computer terminals. This Quarterly Technical Report Briefly describes various aspects of network operation and maintenance (installation of IMPs security activities, Network Control Center program modifications, network hardware maintenance, and developments related to the Terminal IMP, 316 IMP, Pluribus IMP, and Satellite IMP) and presents in detail a systematic method for detecting and preventing interrupt or multiprogramming bugs. (Author)

AD-A016 757/7GA PC$9.50/MF$2.25
Parke Mathematical Labs Inc Carlisle Mass
Implements and Techniques for the Analysis of Radio Propagation through the Arctic Ionosphere Using Three-Dimensional Ray Tracing.
Final rept. Jul 73-Jun 75,
Barbara M. Langworthy, and Theodore B. Barrett. Jun 75, 330p AFCRL-TR-75-0319
Contract F19628-73-C-0307

Descriptors: *Radio transmission, Arctic regions, Ray tracing, Ionospheric models, Computer programming, FORTRAN, Three dimensional.
Identifiers: CDC 6600 computers.

The report describes work done in three-dimensional ray tracing through the arctic ionosphere. An analytical model of the polar trough was developed using data collected or analyzed by AFCRL-LIB. Improved methods for using measurements of plasma frequency in the ray tracing program were effected. A series of display programs were written for the CDC 6600 using ray paths produced by the ray tracing program. A method for calculating energy density to compare with model calculations was developed. The report includes a case study for the mean polar ionosphere using a transmission of 5 MHz. Results for other frequencies as well as other polar models are included in Appendix L. Computer program documentation for all programs and special subroutines developed under this contract are included in the appendices.

AD-A016 762/7GA PC$7.00/MF$2.25
Bazovsky (Igor) and Associates Inc Tarzana Calif
AFSATCOM Terminal No. 3 Reliability Improvement Study.
Final rept.
30 Oct 75, 199p SAMSO-TR-75-242
Contract F04701-75-C-0020

Descriptors: *Communication terminals, Reliability(Electronics), Life cycle costs, Cost effectiveness, Integrated circuits, Radio equipment, Failure(Electronics), Satellite communications.

A sample of SRU's from AFSATCOM Terminal No. 3 are analyzed from a predicted hardware reliability viewpoint. Top reliability problems are noted and design change recommendations are made to improve the predicted hardware reliability first computed. These improvements are linked to life cycle costs to determine their cost effectiveness. Other reliability problems not directly related to life cycle costs are also discussed.

AD-A016 795/7GA PC$3.75/MF$2.25
Naval Underwater Systems Center New London Conn New London Lab
ELF Field Strength Measurements Made in Connecticut During 1974.
Technical rept.,
Peter R. Bannister, and Frederick J. Williams. 1 Oct 75, 43p Rept no. NUSC-TR-4927

Descriptors: *Radio transmission, Extremely low frequency, Field intensity, Periodic variations, Diurnal variations, Magnetic fields, Measurement, Connecticut, Underground antennas.

Both 42- and 76-Hz horizontal magnetic field strength measurements were made in Connecticut during 1974. These measurements are for the purpose of further investigating sunrise, daytime, sunset, nighttime, and seasonal ELF propagation variations. The transmission source for these 1.6-Mm range measurements was the U.S. Navy ELF Wisconsin Test Facility (WTF). The principal results obtained from these measurements were (1) ELF nighttime propagation is much more variable than daytime propagation, (2) the 'Halloween effect' was observed for the fifth year in a row, and (3) there may be as many as 80 nights each year when the average nighttime field strength will be approximately 3 dB lower than on the preceding or following nights.

AD-A016 937/5GA PC$4.25/MF$2.25
Cincinnati Electronics Corp Ohio
Radio Set AN/PRC-70 ( ).
Quarterly rept. no. 9, 1 Jan-31 Mar 75,
C. A. Bucher. Aug 75, 69p Rept no. 80045-PRC41/875 ECOM-0319-9-71
Contract DAAB07-71-C-0319
See also quarterly rept. no. 8, AD-A010 399.

Descriptors: *Transmitter receivers, Portable equipment, High frequency, Tuning devices, Power amplifiers, Frequency synthesizers, Acceptance tests, Very high frequency.
Identifiers: AN/PRC-70.

The report present data from acceptance tests made at room temperature.

AD-A016 993/8GA PC$3.25/MF$2.25
Defense Communications Engineering Center Reston Va
Overseas Autovon Provision of Interim Capability for Precedence Network In-Dialing (PNID) to PABX's.
Technical note,
T. C. Lindamood. Jul 75, 23p Rept no. TN-2-75

Descriptors: *Telephone systems, Communications networks, Switching, Signal processing.
Identifiers: AUTOVON(Automatic Voice Networks), Automatic voice networks, PABX(Private Automatic Branch Exchanges), Private automatic branch exchanges, PNID(Precedence Network In Dialing), Precedence network in dialing.

A method is described whereby, at selected PABX's (Private Automatic Branch Exchanges)

in the overseas AUTOVON, a form of PNID service can be implemented with minimal equipment changes at the AUTOVON switches and at the PABX's, pending establishment of the universal PNID service offering by the USAF. The changes required at the switch and, with one exception, at the PABX are necessary for the future universal PNID service offering.

COM-75-11392/8GA PC$3.75/MF$2.25
Institute for Telecommunication Sciences, Boulder, Colo.
On Bandwidth Limitations at 15 to 45 GHz for a Satellite/Ground Link.
Technical rept.,
H. T. Dougherty, E. J. Dutton, and M. T. Ma. Aug 75, 48p OTR-75-71

Descriptors: *Microwave communication, *Atmospheric attenuation, Bandwidth, Transfer functions, Superhigh frequencies, Extremely high frequencies, Communication satellites, Radio relay systems, Radio links, Errors, Polarization(Waves), Phase shift keying, Rain.

A simple transmission channel transfer function is derived, including the effects of attenuation and phase delays caused by atmospheric gases and spherical raindrops. Based on this transfer function, a formula is obtained to estimate the probability of error in a quadri-phase-keyed (QPSK) system. In addition, an assessment is made of the impact of non-spherical raindrops, in the 15 to 45 GHz frequency region, on both the enhanced attenuation and cross-polarization discrimination for a system using dual linear or orthogonal circular polarizations.

COM-75-11472/8GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Operations Research Section.
Mathematical Methods of Site Selection for Electronic Message Systems (EMS).
Final rept.,
Christoph Witzgall. Jun 75, 45p NBSIR-75-737
Sponsored in part by Postal Service, Rockville, Md. Research and Development Dept.

Descriptors: *Mail, *Telecommunication, Network synthesis, Benefit cost analysis, Optimization, Mathematical programming, Facilities, Planning, Site surveys, Transmission, Communication satellites, Radio relay systems.
Identifiers: Site selection, Satellite communications, Electronic message systems.

The concept of electronic message (mail) transmission has been the subject of several feasibility studies during the past decade. It requires the installation of electronic message handling facilities at selected locations. If transmission is to be via communications satellite, then any such facility can transmit to and receive from any other one. In the report, the mathematical aspects of choosing the number and locations of these facilities are examined. An inventory of solution methods is presented, along with recommendations as to which among them should be employed or developed further.

COM-75-50551/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Data Communications Standards.
Final rept.,
Gerald C. Schutz, and George E. Clark. Feb 74, 6p
Pub. in Computer, v7 n11 p32-37 Feb 74.

Descriptors: *Data transmission systems, *Telecommunication, Standards.
Identifiers: Reprints.

This paper provides an overview description of a number of organizations that are involved in the development of industry, American national and international standards pertaining to data communications. The significant organizations include: the Computer Society of the Institute of Electrical and Electronic Engineers, the Electronics Industries Association, the American National Standards Institute, the International Standards Organization and the International Telecommunications Union. The functions and objectives of the pertinent committees, sub-committees and task groups sponsored by these organizations as well as various formal and informal interworking relationships among them are described. Timely information includes a discussion of presently unresolved technical issues being addressed by the data communication standards community as well as listings of the standards approved by each of the organizations described.

N75-31197/7GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
An Analysis of Spacecraft Data Time Tagging Errors.
A. C. Fang. Sep 75, 34p NASA-TN-D-8073, G-7607

Descriptors: *Error analysis, *Spacecraft communication, *Telemetry, *Time measurement, Computer techniques, Data processing, Error correcting codes, Loran c, Timing devices.

For abstract, see STAR 1322

N75-31299/1GA PC$3.75/MF$2.25
Ohio Univ., Athens. Avionics Engineering Center.
Low-Cost, High-Performance, VLF Receiver Front-End.
R. W. Burhans. Sep 75, 28p NASA-CR-143475
Contract NGR-36-009-017-TM-18

Descriptors: *Linear receivers, *Signal processing, *Very low frequencies, Breadboard models, Channels (Data transmission), Equipment specifications, Integrated circuits.

For abstract, see STAR 1322

N75-31300/7GA PC$5.75/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Single- and Dual-Carrier Microwave Noise Abatement in the Deep Space Network.
D. A. Bathker, D. W. Brown, and S. M. Petty. 1 Aug 75, 149p NASA-CR-143484, JPL-TM-33-733
Contract NAS7-100

Descriptors: *Deep space network, *Microwave antennas, *Microwave frequencies, *Noise reduction, *Spacecraft communication, Electromagnetic interference, Photographs, Reflectors, Spacecraft communication.

For abstract, see STAR 1322

N75-31307/2GA PC$3.75/MF$2.25
Fondazione Ugo Bordoni, Rome (Italy).
Experimental Probing Method by Direct Recording of the Impulse Response on a Radio Link in Lines of Sight. Part 1: Analytic and Circuit Phenomenological Aspects of the Transmitting Medium Characteristics Metodo di Indagine Sperimentale, Mediante Rilevamento Diretto Della Risposta Impulsiva, Su Una Tratta di Ponte Radio in Visibilita. Parte 1: Aspetti Fenomenologici Analitici E Circuitali Delle Caratteristiche Del Mezzo Transmissivo.
G. Diblasio. 3 Aug 74, 42p
Language in Italian.

Descriptors: *Dynamic models, *Mathematical models, *Point to point communications, *Transfer functions, Autocorrelation, Diffraction propagation, Multipath transmission, Tropospheric scattering, Wave propagation.

For abstract, see STAR 1322

N75-31308/0GA PC$3.75/MF$2.25
Fondazione Ugo Bordoni, Rome (Italy).
Effects of Atmospheric Conditions on Electromagnetic Wave Propagation at Frequencies Higher Than 10 Ghz and Systems Design of Terrestrial Telecommunication Projects Influenza Delle Condizioni Atmosferiche Sulla Propagazione Delle Onde E. M. A Frequenze Superiori A, 10 Ghz E Criteri di Progetto di Sistemi di Telecommunicazione Terrestri a Tali Frequenze.
F. Fedi, R. Koch, and B. Peroni. 24 Oct 74, 45p
Language in Italian.

Descriptors: *Italy, *Point to point communications, *Research projects, *Superhigh frequencies, Atmospheric attenuation, Precipitation (Meteorology), Rain gages, Tropospheric scattering.

For abstract, see STAR 1322

N75-31309/8GA PC$4.75/MF$2.25
Royal Radar Establishment, Malvern (England).
Q-Link: A Portable 30 Ghz Solid-State 120 Mb/S Digital Radio.
P. A. Volckman, S. E. Gibbs, and P. Denniss. Sep 74, 88p RRE-TN-777, BR44986

Descriptors: *Data links, *Microwave equipment, *Microwave transmission, *Portable equipment, Duplex operation, High speed, Performance prediction, Phase shift keying, Pulse communication, Radio communication, Solid state devices, Superhigh frequencies, Television transmission.

For abstract, see STAR 1322

N75-31310/6GA PC$4.25/MF$2.25
Heinrich-Hertz-Institute fuer Schwingungsforschung, Berlin (West Germany).
Project Study Video Conference. State-of-the-ART and Proposals for Further Developments Projektstudie Fernsehkonferenz. Stand der Technik und Vorschlaege fuer Weiterentwicklungen.
Final Report.
P. Guenther, P. Neuhold, and G. Plenge. Apr 75, 72p BMFT-FB-T-75-01
Subm-Sponsored by Bundesmin. Fuer Forsch. U. Technol.
In German; English Summary.

Descriptors: *Closed circuit television, *Color television, *Television equipment, Television reception, Television transmission, Voice data processing.

For abstract, see STAR 1322

N75-31311/4GA PC$5.25/MF$2.25
Dornier-System G.m.b.H., Friedrichshafen (West Germany).
Further Considerations on Satellite Communication Systems Applicable to Offshore Gas/Oil Exploitation Activities.
Final Report.
H. Schuessler. Jan 75, 121p ESRO-CR(P)-648
Contract ESRO-SC/7/73-HQ

Descriptors: *Communication satellites, *North sea, *Offshore energy sources, *Offshore platforms, Natural gas, Oil exploration, Phase shift keying, Pulse code modulation.

For abstract, see STAR 1322

PATENT-3 822 038 Not available NTIS
Department of the Navy Washington D C
Multicoupler Percent Frequency Separation Calculator.
Patent,

Irving C. Olson. Filed 15 Jun 72, patented 2 Jul 74, 4p Rept nos. PAT-APPL-263 067,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Calculators, *Patents, Frequency, Separation, Couplers, High frequency, Communication equipment, Antenna components, Coupling circuits.
Identifiers: PAT-CL-235-88, Multicouplers.

The patent describes a circular slide rule device for quickly and accurately determining percent frequency separation necessary between frequencies for acceptable operation in high frequency multicoupler environments. A circular base member is circumferentially graduated clockwise in three concentric, overlapping logarithmic scales which represent frequencies from 2,000 kHz to 30,000 kHz. A transparent cursor member is concentrically and rotably mounted on the base and has marked thereon percent frequency separation indicia with respect to a centerline zero percent reference. The device is easily operated and provides direct readouts of percent frequency separation at any frequency for multicoupler/transmitter/receiver combinations.

PB-245 628/3GA PC$9.25/MF$2.25
Federal Trade Commission, Washington, D.C. Bureau of Consumer Protection.
FTC Advertising Substantiation Program-Color Television Manufacturers. Documentation of Philco-Ford Corporation.
19 Sep 74, 319p FTC-752-3003-PFC

Descriptors: *Truth in advertising, *Manufacturers, *Color television, Publicity, Consumer relations, Integrated circuits, Modules, Reliability, Maintenance, Solid state devices.
Identifiers: Philco - Ford Corporation, Philco - Ford televisions.

Documentation is submitted in support of various claims concerning the number of plug-in modules and integrated circuits; the superiority in design and engineering; the reliability of and the speed and ease of repair; the frequency of repair and extensive coverage by warranty of Philco-Ford solid state color television sets. Portions of this document are not fully legible.

17C. Direction Finding

PATENT-3 827 050 Not available NTIS
Department of the Navy Washington D C
Method and Means for Obtaining Radio Bearings.
Patent,
Burton G. Glazer, and Michael A. Bittner. Filed 15 Feb 73, patented 30 Jul 74, 5p Rept nos. PAT-APPL-332 967,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Radio direction finders, *Patents, Direction finding, Signals, Antenna arrays, Phase shift circuits, Azimuth.
Identifiers: PAT-CL-343-102.

The patent describes a method for generating D.F. signals having the characteristic that their phase difference is proportional to the azimuth with respect to the radiating source. An array of four, vertical, dipole elements equiangularly spaced with respect to the center of the array is fed with a sine wave which is in phase of all the elements and, simultaneously, with another sine wave which is progressively phase-shifted in order, around the array. The sine wave carriers may be phase-modulated with orthogonally related, pseudonoise-coded signals.

PATENT-3 829 674 Not available NTIS
Department of the Navy Washington D C
Slow Modulation Distance Measuring Apparatus.
Patent,
Horace M. Joseph. Filed 26 Jan 73, patented 13 Aug 74, 9p Rept nos. PAT-APPL-326 922,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Locators, *Patents, Transmitters, Correlators, Modulation, Distance measuring equipment, Direction finding.
Identifiers: PAT-CL-235-181.

The primary object of the patent is to provide transmitter location apparatus which can be used with transmitters which radiate intermittent, slowly modulated signals. It is another object of the present invention to provide apparatus for locating unknown transmitters by means of correlation control of playback head position.

17E. Infrared and Ultraviolet Detection

AD-A016 704/9GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
PbS MIS Devices for Charge-Coupled Infrared Imaging Applications.
Journal article,
Frederick J. Leonberger, Theodore C. Harman, and Alan L. McWhorter. 21 Mar 75, 5p Rept no. JA-4498 ESD-TR-75-236
Contract F19628-73-C-0002
Availability: Pub. in Applied Physics Letters, v26 n12 p704-707, 15 Jun 75.

Descriptors: *Infrared images, *Charge coupled devices, Lead sulfides, Semiconductors, Sensitivity, Capacitors, Charge transfer, Reprints.
Identifiers: Metal insulator semiconductors.

Results of an experimental investigation of PbS MIS devices suggest the feasibility of developing a monolithic two-dimensional infrared charge-coupled imaging device (CCID). This CCID would be operable at 77 K and have moderate imaging sensitivity out to about 3.5 micrometers.

AD-908 292/6GA PC$5.25/MF$2.25
RCA Advanced Technology Labs., Camden, N.J.
Pyroelectric/Integrated Circuit Infrared Imaging Array Development.
Interim technical rept. 22 Feb-2 Oct 72,
A. Boornard, D. Hall, E. Herrmann, R. D. Larrabee, and P. Southgate. Nov 72, 107p
AFAL-TR-72-406
Contracts F33615-72-C-1804, ARPA Order-1916
Distribution limitation now removed.

Descriptors: *Infrared detectors, *Integrated circuits, Glycine, Sulfates, Crystals, Silicon, Pyroelectricity, Substrates, Films, Passive systems, Infrared images, Thin films.
Identifiers: *Pyroelectric effect, Triglycine sulfate.

The processing techniques and steps required to form two-dimensional arrays of thin film triglycine sulfate detectors on field-effect integrated circuit substrates are reviewed. The approach to providing the required high degree of thermal isolation between the polycrystalline detectors and the silicon portion of the circuit is to etch away the silicon underlying the detectors. A second pyroelectric imaging array consisting of a thin permanently poled single crystal section of TGS positioned above the integrated circuit substrate is also described. In this arrangement the resulting air gap provides the thermal isolation and contacts to the array detectors are made by means of vacuum deposited microfinger springs.

COM-75-50573/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Time Response of NBS Windowless XUV Radiometric Transfer Standard Detectors.
Final rept.,
E. B. Saimon. Aug 75, 1p
Sponsored in part by Energy Research and Development Administration, Washington, D.C.
Pub. in Applied Optics, v14 n8 p1764 Aug 75.

Descriptors: *Ultraviolet detectors, Performance evaluation, Far ultraviolet radiation, Radiometry, Photodiodes, Aluminum, Aluminum oxides, Standards.
Identifiers: Reprints, Rise time(Electronics).

For the spectral region between 200 A and 1200 A the NBS radiometric standard detector is a windowless photodiode with a 2.5 cm diameter cathode made of evaporated aluminum on whose surface a 150 A thick Al203 layer has been anodized. A study has been made of the response of these diodes to pulsed radiation. A Garton-type flashlamp was modified to provide pulses of radiation with a duration of about 1 micro sec. These pulses were passed through a half-meter Seya-Namioka vacuum monochromator and the zero order radiation was allowed to fall on the cathode of the diode. The rise time of the diode output pulses was on the order of 300 nsec which was the expected rise time of the flashlamp. In order to confirm that the rise time was flashlamp limited, a diode with a tungsten cathode was substituted for the Al203 diode. The temporal results were identical. Thus one is able to conclude that the NBS windowless Al203 radiometric transfer standard diodes have a rise time shorter than 300 nsec.

17F. Magnetic Detection

AD-A016 370/9GA PC$4.75/MF$2.25
Teledyne Geotech Alexandria Va Alexandria Labs
Tunnel Location by Magnetometer, Active Seismic, and Radon Decay Methods.
Technical rept.,
W. C. Dean. 18 Jun 75, 84p Rept no. AL-75-1
Contract F08606-74-C-0013, ARPA Order-1620

Descriptors: *Tunnels, *Magnetic detection, *Seismic detection, *Radioactive decay, Magnetometers, Seismic signatures, Radon, Signal to noise ratio, Granite.
Identifiers: Vela Uniform.

This project investigated three methods of detecting mines or tunnels in granite: magnetic, seismic, and radioactive decay of radon. The magnetic, using a proton precession magnetometer, aims to detect tunnels from the magnetic materials (rails, roof bolts, wiring) these mines are expected to contain. The active seismic methods aims to detect tunnels by reflection or refraction of P-waves from the tunnel or by reverberations of the tunnel walls. The radon decay method aims to detect tunnelling activity by the extra release of radon gas freed into the atmosphere.

17G. Navigation and Guidance

AD-A016 356/8GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
DABS (Discrete Address Beacon System) Downlink Coding.
Project rept.,
J. T. Barrows. 12 Sep 75, 38p Rept no. ATC-48
FAA-RD-75-61
Contracts F19628-76-C-0002, DOT-FA72WAI-261

Descriptors: *Air traffic control systems, *Data links, Coding, Errors, Error correction codes.
Identifiers: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID.

The report summarizes the encoding/decoding techniques incorporated into the DABS downlink design. It has been determined that the binary cyclic code used for the uplink is applicable to the downlink interference environment, thus rendering considerable hardware simplication in the transponder. The downlink environment leads to a characterization as a burst erasure channel, which allows the code to be used in a burst correction capacity. The report concentrates on the error correction techniques including specific implementations. Evaluation of the performance of the code by simulation and/or bench test is presently being carried out and will be reported in a future document.

AD-A016 377/4GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
Investigation of Various Navigation Systems that would be Compatible to the TASES Aircraft.
Master's thesis,
Charles Leroy Jeffries. Sep 75, 89p

Descriptors: *Navigation, *Electronic aircraft, Omega navigation, Theses.
Identifiers: Air navigation, TASES(Tactical Airborne Signal Exploitation Systems), Tactical airborne signal exploitation systems.

TASES (Tactical Airborne Signal Exploitation System) will modify the basic S-3A avionics system to perform an open ocean fleet support electronic mission. Navigation of the aircraft will be performed by the pilot using systems that were designed for an ASW mission and dual piloted aircraft. The addition of an automatic Omega tracking receiver would ease the burden of navigation in the event of primary system failure. The pilot/navigator would be provided a reliable and accurate world-wide fixing device that would augment the basic navigation system. A relative fixing scheme could also be incorporated, using the Omega system that would provide accurate ranges and bearings of reported targets at distances exceeding 250 nautical miles.

AD-A016 385/7GA PC$3.75/MF$2.25
Royal Aircraft Establishment Farnborough (England)
Digital Recording and Processing of Doppler Microwave Landing System Data.
Technical memo.,
G. E. J. Peake. Sep 74, 31p Rept no. RAE-TM-RAD-1063 DRIC-BR-44286

Descriptors: *Microwave landing systems, Doppler systems, Digital systems, Digital recording systems, Data processing, Great Britain, Data acquisition.

The feasibility demonstration stage in the development of the Doppler Microwave Landing System to meet the ICAO OR involves the collecting and processing during the 9 month trials period of a large amount of data. A description is given of the effect of the various decisions made to ensure satisfactory collection, treatment and presentation of the trials results together with the necessary systems descriptions. Most of the DMLS information is in digital form as is the position reference information derived from kinetheodolites. One hundred hours flying consisting of some 500 runs is planned.

AD-A016 463/2GA PC$5.25/MF$2.25
Systems Control Inc Palo Alto Calif
Area Navigation Waypoint Designation Standards.
Final rept.,
R. J. Adams. Jul 74, 121p FAA-RD-75-122
Contract DOT-FA72WA-3098

Descriptors: *Navigation, *Checkout procedures, Standards, Position(Location), Identification, Air traffic.
Identifiers: Area navigation, DOT/4IZ/ID.

The document was prepared to develop a specific waypoint designator format and to provide recommended waypoint location and identification standards. The primary objective of this program was to evaluate the impact of the Task Force concepts on waypoint designation techniques and standards. The satisfaction of this objective was accomplished by thoroughly investigating the alternative techniques for waypoint identification and communication for both charted and impromptu operations. It was necessary to review, analyze and evaluate fourteen proposed waypoint designation techniques in the course of this investigation. The ultimate choice of a waypoint designator had to include provisions for three phases of RNAV implementation with a varying mix of charted and preplanned direct routes. Second, the waypoint designator format had to be compatible with a wide range of airborne area navigation equipment, as well as, with pilot/controller communication practices. Finally, the waypoint designator technique has to accommodate diverse user applications covering the spectrum of general aviation, business and airline applications.

AD-A016 622/3GA PC$6.25/MF$2.25
Stanford Research Inst Menlo Park Calif
Capacity and Productivity Implications of En-route Air Traffic Control Automation.
Final rept.,
G. J. Couluris, R. S. Ratner, S. J. Petracek, P. J. Wong, and J. M. Ketchel. Dec 74, 149p FAA-RD-74-196
Contract DOT-FA7oWA-2142

Descriptors: *Air traffic control systems, *Air traffic controllers, Automation, Display systems, Air traffic, Data processing, Voice communications, Planning, Models, Capacity(Quantity), Work measurement, Networks.
Identifiers: Workload, DOT/4IZ/ID.

This report documents the work performed by Stanford Research Institute (SRI) to evaluate controller productivity and capacity benefits potentially realizable from postulated evolution of enroute air traffic control (ATC) automation. This work focused on the workload limitations of human controllers and the effects on controllers of various automation applications to National Airspace System (NAS) Stage A3d.2 ATC. Empirical measurements of routine, surveillance, and conflict processing activities were used to develop workload models of control-team operations. These models are extensions of the Relative Capacity Estimating Process (RECEP) previously developed by SRI. They were used to assess the potential benefits of enhancements including an electronic tabular flight data display. The workload models were incorporated into the SRI Air Traffic Flow (ATF) network simulation model to assess the potential benefits of a computerized facility-level traffic flow control method termed planning control. (Author)

AD-A016 626/4GA PC$4.25/MF$2.25
Aerospace Guidance and Metrology Center Newark Air Force Station Ohio
AGMC LCC Model for Inertial Navigation Systems.
Final rept.,
Thomas D. Meitzler. 1 Oct 75, 72p Rept no. AGMC-75-001

Descriptors: *Inertial navigation, *Life cycle costs, Cost analysis, Computer programs, Mathematical models, Variables, Constants, Parameters, Logistics.
Identifiers: Cost of ownership, *Life cycle costing.

The purpose of this report is to document a mathematical model currently being used to evaluate the potential life cycle costs of inertial navigation systems. This model has the capability of isolating and analyzing logistics start-up costs. It also allows for inertial system subassembly analysis. The report includes definitions of all input and output parameters, explanation of the equations, program listing with data deck description, and a sample run. (Author)

AD-A016 665/2GA PC$3.75/MF$2.25
National Aviation Facilities Experimental Center Atlantic City N J
Enroute Sector Redesign (Field Survey of Flight Strip Data).
Interim rept. Apr 74-Mar 75,
Richard L. Sulzer, and Robert J. Lucas. Sep 75, 29p Rept no. FAA-NA-75-26 FAA-RD-75-138

Descriptors: *Air traffic control systems, Human factors engineering, Display systems, Data processing.
Identifiers: DOT/4IZ/ID, National airspace system.

A flight data survey has been conducted at eight air route traffic control centers to identify sector flight data requirements when operating with National Airspace System Stage A radar data processing (RDP). Controllers stated which flight data elements, presently shown on paper flight strips, are required for continuous display when using RDP, and which elements can be deleted from display or placed on a call-up status in a redesigned enroute sector. The results of this survey and a concomitant analysis of hand annotation of control information on the strips are intended to guide design of a testable and improved display that can replace the paper strips. Procedures to be followed in demonstrating the potential utility of such a reformatted and automated display of flight data are summarized. Also, tests to be conducted with improved data input facilities are described.

AD-A016 768/4GA PC$3.75/MF$2.25
Air Force Communications Service Richards-Gebaur AFB Mo
TRACALS Evaluation Report. Precision Approach Radar Station Evaluation Report, Fairchild AFB, WA,
Robert L. Cranston. 15 Sep 75, 46p Rept no. 75/66R-46

Descriptors: *Ground controlled approach radar, Air traffic control systems, Radar stations, Air Force facilities, Performance(Engineering), Washington(State).
Identifiers: Fairchild Air Force Base.

A Precision Approach Radar (PAR) station evaluation was conducted at Fairchild AFB, WA (2039 CS) from 1 Aug to 8 Aug 75. This report presents the results of equipment checks, clutter analysis, runway survey, and the flight evaluation. Emphasized in this report is the excessive Angle Voltage Generator (AVG) 24-hour drift which has been observed at 10 of the 11 stateside facilities. In addition, the MTI speed related target deterioration which accurred between 164 and 179 knots is discussed.

AD-A016 774/2GA PC$4.25/MF$2.25
Draper (Charles Stark) Lab Inc Cambridge Mass
A Technique for Compensation of Kinematic Coning Drift.
Technical rept. Jan-Jun 75,

Roy H. Setterlund. Jun 75, 57p Rept no. R-895 SAMSO-TR-75-232
Contract F04701-74-C-0343

Descriptors: *Stabilized platforms, *Drift, Errors, Compensators, Kinematics, Servomechanisms, Gyro stabilizers.
Identifiers: *Kinematic coning.

This report documents a method developed to compensate for kinematic coning drift occurring in inertially stabilized platforms. Kinematic coning drift, which includes so-called rectified rotary vibration, is explained both mathematically and by way of example. The effects of servo bandwidth and the disturbance to inertia ratio on kinematic drift levels are investigated analytically and through computer simulation. The basic method of compensation developed uses platform gyro error signals to estimate angular changes in platform orientation. This estimate is used to recursively update a set of state variables which completely define the axis about which the platform has drifted from its desired inertial orientation. From this, the platform to inertial direction cosine matrix may be constructed.

AD-A016 994/8GA PC$4.75/MF$2.25
Facility Checking Squadron (1866th) (Afcs) Richards-Gebaur AFB Mo
Communications Station Evaluation Report, Dobbins AFB, Georgia.
Station Evaluation,
Bruce E. Wallachy. 29 Sep 75, 80p Rept no. 75/66C/40

Descriptors: *Air traffic control systems, *Communication and radio systems, Very high frequency, Ultrahigh frequency, Radio transmission, Communication equipment, Radio signals, Intensity, Performance(Engineering), Georgia, Air Force facilities.
Identifiers: Evaluation, Dobbins Air Force Base.

A Traffic Control and Landing Systems (TRACALS) Communication Station Evaluation was performed at Dobbins AFB, Ga (2157 Comm Sq) 17 through 29 March 1975. The purpose of the evaluation was to define the capabilities and limitations of the Air Traffic Control VHF/UHF communications system. Included in this report are results and analysis of equipment checks, loop test line level diagrams for the GCA and Control Tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. In addition, there is included a method which can be used to quickly and easily determine the calibration of the Rivet Switch transmitter percent of modulation metering circuits. The data and diagrams presented in this report can be used as a guide for anticipatod performance of the communications system at Dobbins until there is an addition, deletion, relocation of equipment, or change in horizon profile which could affect the ststem. The principles presented in this report are valid for other locations using the same communications equipment.

N75-31047/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
The Influence of Radio Altimeter Errors on Pilot Performance During the Final Approach and Landing Phase of an Rpv Mission.
J. C. Howard. Jul 75, 18p NASA-TM-X-62466, A-6219

Descriptors: *Instrument errors, *Landing, *Pilot performance, *Radio altimeters, *Remotely piloted vehicles, Altitude, Flight simulation, Piper aircraft, Proprioception.

For abstract, see STAR 1322

N75-31048/2GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Effect of External Disturbances and Data Rate on the Response of an Automatic Landing System Capable of Curved Trajectories.
W. L. Sherman. Sep 75, 46p NASA-TN-D-7971, L-10040

Descriptors: *Aircraft landing, *Automatic control, *Landing aids, *Terminal guidance, Algorithms, Microwave landing systems, Turbulence effects.

For abstract, see STAR 1322

N75-31115/9GA PC$3.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Measurement Systems Lab.
Flight Control Systems Research.
Annual Progress Report, 1 Sep. 1974 - 31 Aug. 1975.
H. P. Whitaker. 31 Aug 75, 15p NASA-CR-143620, RN-78
Contract NGL-22-009-548

Descriptors: *Automatic flight control, *Computer programs, *Performance prediction, Algorithms, Design analysis, Digital systems, Search profiles.

For abstract, see STAR 1322

N75-31116/7GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Automatic Guidance and Control of a Transport Aircraft During a Helical Landing Approach.
D. J. Crawford. Sep 75, 57p NASA-TN-D-7980, L-10101

Descriptors: *Air traffic control, *Aircraft guidance, *Aircraft landing, *Automatic flight control, *Transport aircraft, Airports, Algorithms, Flight optimization, Flight paths, Jet aircraft noise, Matrices (Mathematics), Tables (Data).

For abstract, see STAR 1322

N75-31196/9GA PC$5.25/MF$2.25
Airborne Instruments Lab., Deer Park, N.Y.
Low Cost Tracking Navaids Error Model Verification.
Final Repo.t.
A. Charych, A. Tatz, J. Lovell, and R. Frederick. May 75, 125p NASA-CR-144443
Contracts NAS9-14151, AIL PROJ. CO11-1

Descriptors: *Navigation aids, *Position errors, *Space shuttle orbiters, Airborne/spaceborne computers, Breadboard models, Costs, Error analysis, Simulation.

For abstract, see STAR 1322

N75-31205/8GA PC$4.25/MF$2.25
Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
Optimal and Suboptimal Laws for Simple Homing Systems.
J. K. Hammond. Mar 75, 70p AASU-337
Contract MIN-DEF/PE-AT/2040/089/GC

Descriptors: *Homing devices, *Missile control, *Optimal control, Automatic pilots, Control theory, Missile trajectories, Proportional control, Targets.

For abstract, see STAR 1322

N75-31424/5GA PC$7.00/MF$2.25
European Space Research Organization, Paris (France).
Possibilities of Applying the Astrometric Polynomial Model for Direction Finding Using Photographs of Ballistic Cameras.
H. Schnuerer. Mar 75, 200p ESRO-TT-151, DLR-FB-74-58
Tran-Transl. Into English of "Die Anwendungsmoeglichkeiten des Astrometrischen Polynommodells Zur Richtungsbestimmung Aus Photographischen Aufnahmen Ballistischer Kameras", Dfvlr, Brunswick Report Dlr-FB-74-58, 4 Apr. 1974. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 36 Dm.

Descriptors: *Astrometry, *Ballistic cameras, *Photogrammetry, *Polynomials, *Range finders, Astronomical models, Data reduction.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31823/8GA PC$3.25/MF$2.25
National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
A Statistical Method for Error Reduction in an Integration Process Involving Experimental Data.
T. J. Stahlie. Jun 74, 14p NLR-MP-74015-U
Conf-Presented at the Symp. On Computational Statistics, Vienna, 2-6 Sep. 1974.

Descriptors: *Error analysis, *Inertial navigation, *Nonlinear equations, *Numerical integration, *Trajectory measurement, Aircraft maneuvers, Independent variables, Statistical correlation, Stochastic processes, Time dependence.

For abstract, see STAR 1322

PATENT-3 826 575 Not available NTIS
Department of the Navy Washington D C
High Performance Ring Laser Gyroscope with Magneto-Optical Bias.
Patent,
John F. Walter, Jr. Filed 25 Jun 73, patented 30 Jul 74, 5p Rept nos. PAT-APPL-373 212,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Gyroscopes, *Patents, Ring lasers, Magnetooptics, Faraday effect, Rates, Rotation, Detectors.
Identifiers: PAT-CL-356-106-LR.

The patent describes a ring laser gyroscope capable of producing an output signal at low rates of angular rotation. A differential magneto-optical bias system eliminates the requirement of extreme stability in the bias system.

17H. Optical Detection

AD-A016 872/4GA PC$3.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Aerobalistics Directorate
Measurement of Missile Position and Attitude by Lasers.
Technical rept.,
Robert G. Conard, Kynric M. Pell, and John E. Nydahl. 30 Jul 75, 19p Rept no. RD-76-7

Descriptors: *Laser tracking, *Continuous wave lasers, *Midcourse guidance, Measurement, Rockets, Guided missiles, High reliability, Instrumentation, Position(Location), Real time, Pitch(Inclination), Spinning(Motion), Laser beams, Data acquisition, Data reduction, Accuracy, Attitude indicators, Flight testing, Onboard, Corner reflectors, Retroreflectors.

This report presents a method for measuring the position and attitude of spinning rockets and missiles by the use of multiple laser trackers. While the immediate application of this system is in range instrumentation, it has potential as a guidance system - particularly for a guidance system using midcourse or terminal correction. The main advantage of a laser tracking system over existing camera tracking systems is that it would permit near real time reduction of range test data. The program objective is to obtain rocket position and attitude for determination of vehicle aeroballistic parameters from flight tests. The constraints are as follows: (1) Process real time or near time data; (2) Obtain accuracy equal to or better than currently available; (3) Obtain data regardless of flight abnormalities; (4) Obtain high reliability for data acquisition; (5) Extend testing capability to low ambient light situation including night operation; and (6) Reduce overall cost of data acquisition and reduction.

17I. Radar Detection

AD-A016 439/2GA PC$6.25/MF$2.25
Tennessee Univ Knoxville Dept of Electrical Engineering
Investigation of Radar Rain Clutter Cancellation Using a Polarization Method.
Final technical rept. 16 Oct 73-31 Dec 74,
R. W. Rice, and Peyton A. Peebles. Aug 75, 157p
RADC-TR-75-126
Contract F30602-74-C-0037

Descriptors: *Radar clutter, Rain, Cancellation, Polarization, Backscattering, Monostatic radar, Atmospheric scattering.
Identifiers: Atmospheric attenuation.

The work considers a new polarization method for possible reduction of rain clutter in monostatic radar. Basically, the proposed technique attempts to adjust the effective polarization of the receiver to match the average polarization of backscattered fields to improve the cancellation attainable from systems ordinarily using circular polarization.

AD-A016 666/0GA PC$4.25/MF$2.25
Federal Aviation Administration Washington D C Systems Research and Development Service
Radar Enhancement of Small Aircraft in the Air Traffic Control (ATC) System.
Final rept.,
Donald H. Turnbull. Sep 75, 425p Rept no. FAA-RD-75-98

Descriptors: *Radar, Aircraft, Air traffic control systems, Radar cross sections, Performance(Engineering), Active systems, Passive systems, Radar reflections, Transponders.
Identifiers: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, DOT/4IZ/IE.

An investigation was undertaken to develop and determine the practicality of small aircraft radar enhancement devices. This report discusses the detection capability of present radars as well as an analysis and evaluation of passive radar enhancement devices and active radar enhancement devices. The report concludes that passive enhancement devices are not practical and that active enhancement devices are too costly when compared to the existing Air Traffic Control Radar Beacon System (ATCRBS) transponders.

AD-A016 706/4GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
10.6-Micrometers FM-Chirp Radar Using Narrow-Band Correlation Detection.
Journal article,
William E. Bicknell, Louis R. Tomasetta, and Robert H. Kingston. 17 Feb 75, 5p Rept no. JA-4477 ESD-TR-75-233
Contract F19628-73-C-0002, ARPA Order-600
Availability: Pub. in IEEE Jnl. of Quantum Electronics, p308-311 Jun 75.

Descriptors: *Chirp radar, Correlation techniques, Frequency modulation, Radar range calibrators, Carbon dioxide lasers, Narrowband, High resolution, Heterodyning, Pulse compression, Ku band, Reprints.

The authors report the demonstration of high-resolution 10.6-micrometers radar-range resolution using a broad-band FM-chirp signal, but requiring only Narrow-band performance in a heterodyne detector. (Author)

AD-A016 779/1GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Experimental Verification of the Performance of the Aperture Sampling Technique.
Technical note,
Israel Kupiec. 15 Sep 75, 44p Rept no. TN-1975-45 ESD-TR-75-261
Contract F19628-76-C-0002

Descriptors: *Radar reflections, *Angle of arrival, Antenna apertures, Sampling, Multipath transmission, Radar interference, Ground level, Radar tracking, Conical scanning, Monopulse radar.
Identifiers: Aperture sampling technique.

An experimental verification of the aperture sampling technique as a means of estimating the angle-of-arrival in the presence of ground reflection interference is reported. The technique is found to perform satisfactorily down to 1/5 of a beamwidth elevation. Beam splitting better than 20:1 is demonstrated. This performance is obtained by using a minimizing search processing that allows use of a larger number of samples than the number required by the closed form solution.

AD-A016 881/5GA PC$3.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Advanced Sensors Directorate
Some Considerations on Targets for Radar Guided Air Defense Systems.
Technical rept.,
James W. Wright. 15 Sep 75, 19p Rept no. RE-76-10

Descriptors: *Radar signatures, *Radar homing, *Radar targets, Radar cross sections, Air defense, Augmentation, Bistatic radar, Monostatic radar, Radar antennas, Flat plate models, Flight testing.

The purpose of this report is to present some considerations which may affect the design and/or selection of test targets for radar guided air defense systems. The primary consideration is the dynamic radar signature presented by the target. This report is generally of a qualitative nature and is intended to be a tutorial exposition of problems. Recommendations on research efforts to fill in some data gaps are made. (Author)

PATENT-3 821 751 Not available NTIS
Department of the Navy Washington D C
Method for World Wide Synchronization of Tracking Radars.
Patent,
John C. Loos. Filed 27 Mar 72, patented 28 Jun 74, 6p Rept nos. PAT-APPL-238 615,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Synchronization(Electronics), *Radar tracking, *Patents, Radar stations, Global.
Identifiers: PAT-CL-343-5-R.

The patent describes a system and method for accurately synchronizing a plurality of radar stations which are tracking the same target. The system provides a very accurate frequency standard from which epoch, i.e., 'on time', pulses can be determined. With this information accurately maintained, computer analysis can provide the proper offset from epoch time which will prevent interference or beacon stealing at acquisition. Monitoring of a radar station's transmission provides information from which PRF occurrence can be advanced or retarded to also eliminate beacon stealing.

PATENT-3 821 752 Not available NTIS
Department of the Navy Washington D C
Electronic Interference Detector for Range-Tracking Pulse Radar Systems.
Patent,
James F. McKelvey. Filed 31 Aug 66, patented 28 Jun 74, 4p Rept nos. PAT-APPL-576 785,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Radar antijamming, *Patents, Detectors, Electromagnetic interference, Fire control radar.
Identifiers: PAT-CL-343-7-3.

The patent describes an electronic interference detector which uses the minimum video amplitude at target return time as the criterian for detector action. In radar operation this will insure that the detector threshold will be directly related to the effective noise-to-signal ratio so that the detector threshold can be set at a value such that the radar tracking modes will be altered only when necessary.

17J. Seismic Detection

AD-A016 537/3GA PC$3.75/MF$2.25
Teledyne Geotech Alexandria Va Seismic Data Analysis Center
Performance of the PHILTRE Processor at Low Signal-to-Noise Ratios.
Technical rept.,
P. A. Sobel, and D. H. von Seggern. 31 Jul 75, 49p Rept no. SDAC-TR-75-6
Contract F08606-76-C-0004, ARPA Order-1620

Descriptors: *Seismic detection, *Signal processing, *Seismic waves, Signal to noise ratio, Seismic arrays, Adaptive systems, Rayleigh waves, Nonlinear systems.
Identifiers: Vela Uniform, Seismic discrimination, Adaptive filters, PHILTRE processor.

In this report it is shown that a non-linear, adaptive processor called PHILTRE is useful in detecting long-period Rayleigh waves in various low signal-to-noise ratio situations: signals buried in noise at various levels, two signals mixed at various azimuths and relative amplitudes, and a suite of visually undetected signals at LASA, ALPA, and NORSAR from the Kurils-Kamchatka region. PHILTRE lowered the detection threshold for Rayleigh waves buried in noise by about 6 dB. It was able to separate two signals if their azimuthal spearation was greater than 60 degrees and if at the same time the amplitude of the second signal was at least 20 percent of the amplitude of the first signal. It lowered Rayleigh-wave 50% detection thresholds by roughly 0.2 (m sub b) unit at the three long-period arrays.

AD-A016 604/1GA PC$5.75/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
A Study of Communications for the Seismic Data Collection Network.
Final rept. 1 Aug 74-30 Jun 75,
Howard W. Briscoe. 30 Jun 75, 130p Rept no. BBN-3109
Contract F08606-75-C-0017, ARPA Order-2551

Descriptors: *Seismic detection, *Communications networks, *Seismological stations, *Data acquisition, Data processing, Nuclear explosions, Interfaces, Satellite communications.
Identifiers: ARPA computer network, Computer networks, VELA UNIFORM.

This report presents the results of studies performed to support the implementation of a worldwide seismic data collection network using a mix of ARPA Network and leased line communications. Host level protocols for the ARPA Network links are specified. An analysis of the traffic generated by the seismic data subnet identified potential limits imposed by the bandwidth and buffer capacity at two nodes of the network. Operational monitoring and diagnostic procedures are recommended. A backup plan for the system design is developed in case error rates in local communications to the seismic stations are excessive. Design specifications for the Seismic Private Line Interface computer for interfacing existing seismic station controllers to the ARPA Network are included as an appendix.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

NTIS/PS-75/783/1GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Laser Fusion (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
David W. Grooms. Oct 75, 114p*
See also NTIS/PS-75/784.

Descriptors: *Bibliographies, *Nuclear fusion, *Laser beams, Thermonuclear reactions, Plasmas(Physics), Computerized simulation, Mathematical models, Pulse heating, Computer programming.
Identifiers: Laser produced plasmas, Laser implosions, Plasma instabilities.

The bibliography cites research on theoretical and computer simulation studies of laser induced fusion. Target fabrication, laser implosion instability and laser produced plasma studies are included. Included are Soviet developments in laser fusion. (Contains 109 abstracts) See also NTIS/PS-74/131, Nuclear Fusion and NTIS/PS-75/784, Electron Beam Fusion.

NTIS/PS-75/784/9GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Electron Beam Fusion (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
David W. Grooms. Oct 75, 49p*
See also NTIS/PS-75/783.

Descriptors: *Bibliographies, *Nuclear fusion, *Electron beams, Thermonuclear reactions, Plasmas(Physics), Nuclear fuel pellets, Pulse heating.

The bibliography cites research on using electron beams to initiate fusion. Theoretical and experimental research concerned with the generation and dynamics of relativistic electron beams and their interaction with high atomic number materials is included. (Contains 44 abstracts) See also NTIS/PS-74/131, Nuclear Fusion and NTIS/PS-75/783, Laser Fusion.

18D. Nuclear Instrumentation

AD-A016 766/8GA PC$4.25/MF$2.25
Kent State Univ Ohio Dept of Physics
Spark Chamber Spectrometry and Space Radiation Studies. III.
Final rept. 1 Apr 72-30 Jun 75,
Richard Madey, and Alan R. Baldwin. 31 Oct 75, 69p Rept no. KSUPD-75-3 AFCRL-TR-75-0441
Contract F19628-72-C-0204

Descriptors: *Spark chambers, *Data acquisition, *Cosmic rays, Spectrometers, Pulse height analyzers, Coincidence counting, Telescopes, Portable equipment, Upper atmosphere.

A portable spark-chamber range-spectrometer and electronic data acquisition system is described for acquiring spectral data on energetic charged particles. The instrument system consists of a unidirectional spark-chamber range telescope with pulse-height analysis of the specific-energy loss (dE/dx) of a charged particle that passes through a triggering telescope. The range telescope consists of a stack of sealed double-gap spark-discharge modules with absorbers sandwiched between them. A Cerenkov counter discriminates against electrons and muons. Cerenkov and dE/dx signals are gated by the coincidence circuit. Data, either telemetered or recorded in situ, include the number of coincidences, a clock signal, system voltage levels, and the dE/dx, Cerenkov, and spark-discharge module signals. Power consumption of the self-contained system is about 10 watts at an event rate of 20 per second and 17 watts at an event rate of 100 per second. The standby power is about 8 watts. This instrument system can measure primary protons and alphas at balloon altitudes and secondary protons at lower altitudes.

COM-75-50565/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Use of Pressed LiF for Thermoluminescence Dosimetry Without Furnace Annealing.
Final rept.,
Margarete Ehrlich. 1974, 7p
Pub. in Physics in Medicine and Biology Technical Note, v19 n5 p725-731 1974.

Descriptors: *Dosimetry, *Lithium fluorides, Thermoluminescence.
Identifiers: *Thermoluminescent dosimetry, Reprints.

A method of LiF thermoluminescence dosimetry (TLD) requiring no furnace annealing is described which can be used with many general-purpose commercial TLD readers. With this method, one produces LiF TLD characteristics similar to those obtained after conventional annealing. Glow-curve areas following successive identical exposures of a sample reproduce to within a relative standard deviation of 1%, but peak heights are less reproducible. Supralinearity characteristics are similar to those of conventionally annealed samples. While fading is somewhat more pronounced, it is not prohibitive for many medical applications. Maximum nominal planchet temperatures of 300C during readout produce essentially complete annealing in the medical exposure range, without appreciable loss in sensitivity due to successive irradiations and readouts, while sensitivity losses sometimes amount to as much as 8-10% for maximum nominal readout temperatures of 400C.

COM-75-50601/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Some Limitations in the Use of Plastic and Dyed Plastic Dosimeter.
Final rept.,
Arne Miller, Erling Bjergbakke, and William L. McLaughlin. Oct 75, 10p
Sponsored in part by Danish Atomic Energy Commission, Roskilde. Accelerator Section.
Pub. in International Jnl. of Applied Radiation and Isotopes, v26 n10 p611-620 Oct 75.

Descriptors: *Dosimeters, *Plastics, Dyes, Cellulose acetate, Cellophane, Polymeric films, Polymethyl methacrylate, Polyvinyl chloride.
Identifiers: Reprints, Cellulose triacetate.

Several practical plastic and dyed plastic dosimeters were examined under irradiation conditions similar to those used for radiation processing of materials. Cellulose triacetate, polymethyl methacrylate, polyvinyl chloride, dyed polymethyl methacrylate, dyed Cellophane and dyed Nylon were given fractionated and uninterrupted absorbed doses in the megarad range with 60 Co gamma rays and 10 MeV electon beams. It was found that with some systems, differences in radiation response due to dose-rate and temperature dependence can cause large systematic errors in dose interpretation. Poor reproducibility of response may result from batch-to-batch differences or intrabatch variations in thickness, distribution of sensitizers and background optical density. When using these routine dosimeters, careful calibration of the response and monitoring of factors contributing to poor reproducibility are essential.

18E. Nuclear Power Plants

PB-245 404/9GA PC$3.75/MF$2.25
Nuclear Regulatory Commission, Washington, D.C.
Report to the Congress on Abnormal Occurrences. January-June 1975.
Oct 75, 36p NUREG-75/090

Descriptors: *Nuclear power plants, *Nuclear reactor safety, *Nuclear reactor accidents, Boilers, Piping systems, Nuclear reactor coolants, Control rods.

During the first half of 1975, no incidents or events occurred at the 53 licensed operating nuclear power plants which had an actual impact on or consequence to the health and safety of the public. However, although an adequate margin of safety was always present, some events did occur which involved a temporary but significant reduction in the level of protection. These three single, one recurring, and three generic significant events were considered to be abnormal occurrences, and are reviewed in this report. The occurrence of these events has shown that the reliance on the defense-in-depth concept is sound for the protection of public health and safety. Although the reported events took place within the first six months of 1975, the descriptions, causes, and actions taken to prevent recurrence are reported based on status as of July 31, 1975.

PB-245 579/8GA PC$9.50/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to Construction of Palo Verde Nuclear Generating Station Units 1, 2 and 3, Arizona Public Service Company, et al, Docket Nos. STN 50-528, STN 50-529, and STN 50-530.
10 Oct 75, 345p NUREG-75/098

Descriptors: *Nuclear reactor safety, *Nuclear power plants, Nuclear electric power generation, Nuclear reactor sites, Design criteria, Safety engineering, Nuclear reactor engineering, Seismic surveys, Radioactive waste processing, Arizona.
Identifiers: *Palo Verde nuclear power plant, Maricopa County(Arizona).

A Safety Evaluation Report of the application for a license to construct the proposed Nuclear Generating Station, located in Maricopa County, Arizona, has been prepared. It consists of a technical review and staff evaluation of applicant information on: (1) population density, land use, and physical characteristics of the site area; (2) design, fabrication, construction, testing criteria, quality assurance program, and performance characteristics of plant structures, systems, and components important to safety; (3) expected response of the facility to anticipated operating transients, and to postulated design basis accidents; (4) applicants' engineering and construction organization, and plans for the conduct of plant operations; and (5) design criteria for a system to control the plant's radiological effluents. The staff has concluded that the plant can be constructed by the applicants without endangering the health and safety of the public provided that the outstanding matters discussed in the report are favorably resolved.

PB-245 721/6GA PC$7.50/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Nuclear Reactor Regulation.
Environmental Statement Related to Construction of Perkins Nuclear Station, Units 1, 2, and 3. Duke Power Company, Docket Nos. STN 50-488, 50-489, and 50-490.
Final rept.
Oct 75, 235p NUREG-75/088

Descriptors: *Nuclear electric power generation, *Nuclear power plants, *Environmental surveys, *Environmental impact statements, Site surveys, Nuclear reactor safety, Radiation hazards, Benefit cost analysis, North Carolina.
Identifiers: Perkins-1 reactor, Perkins-2 reactor, Perkins-3 reactor, Davie County(North Carolina), Perkins nuclear power plant.

A Final Environmental Statement for the Duke Power Company for the construction of the Perkins Nuclear Station, Units 1, 2, and 3 (Docket Nos. STN 50-488, 50-489, and 50-490, respectively), located in Davie County, North Carolina, has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. This statement provides (1) a summary of environmental impact and adverse effects of the proposed facility, and (2) a consideration of principal alternatives. Also included are comments of governmental agencies and other organizations on the Draft Environmental Statement for these projects, and staff responses to these comments. The NRC Staff has concluded, based on a weighing of the environmental, economic, technical, and other benefits against environmental costs and available alternatives, that construction permits could be granted. This is not a final licensing action. The applicant will be required to assure that adverse environmental impact from construction activities will be kept to a minimum, submit a detailed erosion control plan prior to start of construction activities and prepare an environmental evaluation before engaging in construction activities not evaluated by the Commission.

PB-245 722/4GA PC$3.25/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to Construction of Byron Station, Units 1 and 2, Braidwood Station, Units 1 and 2. Commonwealth Edison Company, Supplement No. 2, Docket Nos. STN 50-454, 50-455, 50-456, 50-457.
Oct 75, 25p NUREG-75/023-Suppl-2

Descriptors: *Nuclear power plants, *Nuclear reactor safety, Site surveys, Structural design, Nuclear reactor coolants, Radiation hazards, Illinois.
Identifiers: Byron-1 reactor, Byron-2 reactor, Braidwood-1 reactor, Braidwood-2 reactor, Byron nuclear power plant, Braidwood nuclear power plant, Will County(Illinois), Ogle County(Illinois).

Supplement No. 2 of the Safety Evaluation Report of the Commonwealth Edison Company's application for licenses to construct and operate its proposed Byron Station, Units 1 and 2 (Docket Nos. STN 50-454 and STN 50-455), and Braidwood Station, Units 1 and 2 (Docket Nos. STN 50-456 and STN 50-457), has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. This Supplement updates the Safety Evaluation Report by providing (1) an evaluation of the outstanding matters in Supp No. 1, (2) an evaluation of additional information submitted by the applicant since the issuance of Supp No. 1 (August 1, 1975), and an evaluation of new safety issues that have been identified since the issuance of Supp No. 1. With this Supplement it is concluded that all of the outstanding matters have been satisfactorily resolved, and that the Byron and Braidwood Stations can be constructed and operated as proposed without endangering the health and safety of the public.

PB-245 724/0GA PC$10.00/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Standards Development.
Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. LWR Edition. Revision 2.
Oct 75, 353p NUREG-75/094

Descriptors: *Nuclear power plants, *Nuclear reactor safety, Site surveys, Structural design, Seismology, Nuclear reactor coolants, Reliability.

Regulatory Guide 1.70, Revision 2, 'Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants--LWR Edition,' identifies the principal information that should be provided by applicants in safety analysis reports for light-water-cooled reactors and provides a uniform format for presenting the information. This edition, which will replace the October 1972 issue (Revision 1), reflects changes in the NRC staff's information needs and review procedures. Revision 2 of the Standard Format was developed in parallel with and is keyed to the Standard Review Plans prepared by the NRC's Office of Nuclear Reactor Regulation.

PB-245 972/5GA PC$7.00/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Nuclear Reactor Regulation.
Construction of Tyrone Energy Park, Unit No. 1, Northern States Power Company of Wisconsin. Northern States Power Company of Minnesota. Docket No. STN-50-484.
Safety evaluation rept.
Oct 75, 189p NUREG-75/102

Descriptors: *Nuclear reactor safety, *Nuclear power plants, Nuclear electric power generation, Nuclear reactor sites, Design criteria, Safety engineering, Nuclear reactor engineering, Seismic surveys, Radioactive waste processing, Texas.
Identifiers: *Tyrone Energy Park nuclear power plant, Matagorda County(Texas).

A safety evaluation for a construction permit to construct the Tyrone Energy Park, Unit No. 1 located in Matagorda County, Texas, has been prepared. It consists of a technical review and staff evaluation of applicant information on: (1) population density, land use, and physical characteristics of the site area; (2) design, fabrication, construction, testing criteria, quality assurance program, and performance characteristics of plant structures, systems, and components important to safety; (3) expected response of the facility to anticipated operating transients, and to postulated design basis accidents; (4) applicant engineering and construction organization, and plans for the conduct of plant operations; and (5) design criteria for a system to control the plant's radiological effluents. The staff has concluded that the plant can be constructed by the Northern States Power Company without endangering the health and safety of the public provided that the outstanding matters discussed in the report are favorably resolved.

PB-246 053/3GA PC$9.25/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Nuclear Reactor Regulation.
Construction of Wolf Creek Generating Station, Unit 1. Kansas Gas and Electric Company and Kansas City Power and Light Company. Docket No. STN-50-482.
Final environmental statement.
Oct 75, 321p NUREG-75/096

Descriptors: *Environmental impact statements, *Nuclear power plants, *Nuclear electric power generation, *Site surveys, Pressurized water reactors, Cooling water, Pollution, Radiation hazards, Ecology, Radioactive waste processing, Kansas.
Identifiers: *Wolf Creek nuclear power plant, Coffey County(Kansas).

A Final Environmental Statement for the construction of the proposed generating station, located in Coffey County, Kansas, has been prepared. The statement provides (1) a summary of environmental impact and adverse effects, and (2) a consideration of principal alternatives. Also included are comments of Federal agencies and other State and local organizations on the Draft Environmental Statement for this unit, and staff responses to those comments. The NRC staff has concluded, based on a weighing of the environmental, economic, technical, and other benefits, against environmental costs and available alternatives, that a construction permit could be granted.

18K. Reactor Physics

COM-75-50586/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Measurement of Absolute Fission Rates.
Final rept.,
J. A. Grundl, N. D. Dudey, and R. J. Popek. 1973, 2p
Pub. in Transactions of the American Nuclear Society, v17 p516-517 1973.

Descriptors: *Plutonium 239, *Uranium 235, *Nuclear fission, Neutron flux, Nuclear fuels.
Identifiers: Reprints, *Uranium 238, *Neptunium 237.

Recently, the accuracy requirements for fast reactor fuels and materials dosimetry surpassed the existing capabilities of fission foil activation measurements. In order to improve this capability by direct calibration of activation detectors, absolute fission rates per nucleus have been measured in fast neutron fluxes suitable for both fission activation foils and for fission fragment detectors. This paper presents results for absolute fission fragment emission rates from 239Pu, 235U, 238U, and 237Np exposed to the first of these fast neutron fluxes, the spectrum of the CFRMF Reactor at ANC.

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A016 334/5GA PC$3.75/MF$2.25
Picatinny Arsenal Dover N J

M483 Projectile Short Term Sticker Investigation.
Interim status rept.,
R. Corn. 6 Jul 75, 46p

Descriptors: *Howitzers, *Projectiles, *Malfunctions, Gun barrels, Interior ballistics, Rotating bands, Lubrication, Firing tests(Ordnance).
Identifiers: M-483 cartridges(155-MM).

The report discusses the causes of a projectile 'sticker' problem and presents remedial action for correcting the problem.

AD-A016 716/3GA PC$12.50/MF$12.50
Army Materiel Command Alexandria Va
Engineering Design Handbook. Propellant Actuated Devices.
Sep 75, 198p Rept no. AMCP-706-270
Supersedes AD-449 769.

Descriptors: *Propellant actuated devices, *Handbooks, Gas generating systems, Propellants, Interior ballistics, Escape systems, Performance tests, Catapults, Computer programs.
Identifiers: *Engineering design handbooks.

The handbook is a revision of the existing handbook published in 1963. The revision updates the material and design methodology, and introduces the application of computer techniques. Also, the revision reorganizes the material and presents the design information in a more logical sequence. The handbook is a guide to design engineers engaged in the development of propellant actuated thrust devices and gas generators for various applications. Topics discussed include the following: Description of propellant actuated devices; Basic design considerations; Preliminary design techniques; Interior ballistic analysis; Design examples; Performance evaluation; Conversion of distortion energy equation to more useful forms for propellant actuated devices; Table of wall ratios; Derivation of equation used in determining length of engagement threads; Computer program for simulation of direct stroking device; Computer program for high-low stroking device; Computer program for high-low grain design.

AD-A016 773/4GA PC$4.25/MF$2.25
Franklin Inst Research Labs Philadelphia Pa
Susceptibility of the M52A3B1 Primer to Ignition from Static Electricity Generated by a Human Subject.
Technical rept. Jul 74-Sep 75,
Charles T. Davey. Sep 75, 74p Rept no. FIRL-F-C3967
Contract DAAA25-75-C-0175
Errata sheet inserted.

Descriptors: *Electric primers, *Ignition, *Static electricity, Human body, Clothing, Arctic regions, Electrostatics, Electrical resistance, Resistance(Biology).
Identifiers: M-52 primers, M-52A3B1 primers.

Three lots of primers with resistances of 30,000, 300,000 and approximately 3,000,000 ohms were evaluated for sensitivity from circuits that were synthesized from measurements on small, medium and large human subjects dressed in cold-weather and Arctic army uniforms. Subjects were charged to a known voltage and then discharged into simulators for each of the three primer lots.

AD-A016 871/6GA PC$3.25/MF$2.25
Frankford Arsenal Philadelphia Pa
Determination of Barium and Strontium Peroxides (Active Oxygen) in Igniters in Small Arms Tracer Ammunition.
Technical test rept.,
George Norwitz, and Michael Galan. Aug 75, 16p Rept no. FA-TT-75059

Descriptors: *Small arms ammunition, Igniters, Barium oxides, Strontium compounds, Peroxides, Oxygen, Small arms, Tracer ammunition, Determination, Hydrochloric acid, Deterioration, Storage, Titanium, Chemical analysis.

A method is proposed for the determination of barium and strontium peroxides (active oxygen) in igniters in small arms ammunition. The sample is treated with dilute hydrochloric acid (1 to 9) which dissolves the magnesium powder almost instantaneously and then dissolves the barium or strontium peroxides within 10 to 30 minutes. The solution is then filtered to remove the organic substances (calcium resinate, Parlon, toluidine red toner, and zinc stearate) and the peroxide is determined by the titanium peroxide color. It appears that igniter mixes and igniters used in small arms tracer ammunition deteriorate with storage. (Author)

AD-A016 875/7GA PC$3.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Guidance and Control Directorate
Statistical Analysis of Cannon Launched Guided Missile Projectile Hardware-in-the-Loop Simulations. Volume I.
Technical rept.,
Larmon S. Isom, and Harold L. Pastrick. 2 Jul 75, 14p Rept no. RG-76-1

Descriptors: *Guided projectiles, Gun launchers, Simulation, Closed loop systems, Errors, Statistical analysis.
Identifiers: Cannon launched guided projectiles, Hardware in the loop simulations.

This report presents a complete documentation of the statistical analysis performed on the hardware-in-the-loop simulations of the cannon launched guided projectile. Section 1 of this report contains an introduction and the background information pertaining to the Cannon Launched Guided Projectile hardware-in-the-loop simulations. Section 2 contains the necessary information for the arithmetic mean and standard deviation computation of the errors and/or results obtained from a series of tests, experiments, observations, etc. For the case of the Cannon Launched Guided Projectile simulations, the results obtained were the errors in the miss distance. The construction of histograms and frequency polygons are also discussed in Section 2. Section 3 describes an automated procedure for the preceding computations and constructions. The results, conclusions, and comments of the statistical analysis processes are presented in Section 4. The complete statistical analysis process as it applies to the results obtained from the Cannon Launched Guided Projectile hardware-in-the-loop simulations are contained in Volume 2 of this report. (Author)

N75-31277/7GA PC$4.75/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Standard Procedure for Studying the Sensitivity to Shock Waves of Condensated Explosives. Application to a Cast Composite Description d'UN Mode Operatoire Standard pour l'Etude de la Sensibilite des Explosifs Condenses a l'Onde de Choc. Application a Une Composition Coulee.
Y. Delongueville. 22 May 74, 77p ISL-19/74
Contract SNPE-14/73/D
Language in French.

Descriptors: *Explosives, *Shock resistance, *Shock waves, Impact resistance, Shaped charges, Shock wave generators, Stability tests, Standardization, Thin plates.

For abstract, see STAR 1322

N75-31278/5GA PC$3.25/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Towards a New Computation of the Hollow Charge Vers UN Nouveau Formalisme de la Charge Creuse.
E. Perez, and C. Fauquignon. 11 Feb 75, 24p ISL-3/75
Language in French.

Descriptors: *Implosions, *Inelastic collisions, *Shaped charges, Compressibility effects, Computation, Numerical analysis.

For abstract, see STAR 1322

PATENT-3 827 362 Not available NTIS
Department of the Navy Washington D C
Electrical Circiut Destruct System.
Patent,
Clayton M. Huggett. Filed 14 Aug 72, patented 6 Aug 74, 4p Rept nos. PAT-APPL-282 084,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Destructors, *Pyrotechnics, *Patents, Circuits, Destruction, Security, Reactants(Chemistry), Aluminum, Magnesium, Fluorinated hydrocarbons.
Identifiers: PAT-CL-102-90.

The patent describes a system for destroying critical electrical circuitry within a pressurized container, without creating hazards to surrounding apparatus and personnel, using active metals and the pressurizing gas as a reactant.

19D. Explosions, Ballistics, and Armor

AD-A016 587/8GA PC$3.75/MF$2.25
Naval Surface Weapons Center Dahlgren Lab Va
Determination of Miss Distances and Hit Probabilities in the Presence of Time Varying Random, and Bias Errors.
Final rept.,
Michael S. Borowsky. Jul 75, 34p Rept no. NSWC/DL-TR-3327

Descriptors: *Miss distance, *Sampling, *Monte Carlo method, Normal density functions, Markov processes, Approximation, Probability.

A Monte-Carlo method for obtaining miss distances due to time varying, random, and bias errors which involves only one random sample per coordinate and closed form approximations for computing the probability of at least one hit and the expected number of hits in an n round engagement are presented.

AD-A016 861/7GA PC$3.25/MF$2.25
Army Materiel Systems Analysis Activity Aberdeen Proving Ground Md
Rupture as a Function of Deformation in Flat Plates Exposed to HE Mine Blast,
Richard M. Norman. May 75, 17p Rept no. AMSAA-TR-127

Descriptors: *Armored vehicles, *Land mines, Blast, Antitank ammunition, Metal plates, Deformation, Military personnel, Vulnerability.

This report addresses the vulnerability of armored vehicles and possible injury of their occupants to HE mine blast loading. Specifically reported are the results of literary research in the following two areas: the value (height) of flat plate deformation that can be associated with plate rupture, and the hazard to vehicle occupants of the vertical motion of the floor armor, especially the elastic (temporary) deflec-

tion. Values are shown for the threshold of plate rupture as a function of deformation for various plate thicknesses. Vertical, elastic-phase, deflections of one or two inches for large, open, floor areas are predicted, for non-rupturing blast mine loading. Occupant injuries are likely here, and shock isolation references are briefly discussed.

AD-A016 885/8GA PC$3.25/MF$2.25
Frankford Arsenal Philadelphia Pa
The Effect of Statistical Velocity Variation on the Gaussian Bivariate Probability of Hit for Small Caliber Systems.
Technical research rept.,
Frederick A. Malinoski , and Jerzy Nilmirow.
May 75, 24p Rept no. FA-TR-75037

Descriptors: *Interior ballistics, *Small arms ammunition, Hit probabilities, Propellants, Terminal ballistics, Velocity, Probability distribution functions, Errors, Standard deviation, Statistical analysis, Aiming, Cartridges.
Identifiers: M-16 guns(5.56-mm), M-14 Gun barrels(7.62-mm).

The statistical variations in both the average velocity and the linear standard deviation of velocity, due to the location of propellant airspace, are investigated by trajectory conversions to errors on a vertical target and by calculations of rectangular hit probabilities with the Gaussian bivariate distribution. The two cartridges examined are the 7.62mm, Ball, M80 and the 5.56mm, Ball, M193. Sources of errors and their magnitudes are discussed. Two diverse levels of aiming error are assumed, corresponding to present requirements for the Future Rifle System. The range-dependent errors due to velocity variations are treated as perturbations of the ballistic error. The nose-tap (NT) procedure of chambering cartridges is compared to the standard base-tap (BT) procedure by assuming that zero bias is applicable to the BT procedure and that the NT procedure introduces a finite bias. Calculations are conducted with assumptions which tend to maximize the influence of the velocity variation, and the limiting case of zero aiming error is also treated. The changes in hit probability due to the statistical velocity variations corresponding to the BT and NT air space positions are shown to be insignificant for these two standard cartridges. (Author)

AD-A016 909/4GA PC$3.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Analysis of Projectile Penetration into Concrete and Rock Targets.
Final rept.,
Behzad Rohani. Sep 75, 37p Rept no. AEWES-Misc-Paper-S-75-25
Presented at Defense Nuclear Agency's Earth Penetrating Weapon Program Review, Alexandria, Va., 13 Aug 74.

Descriptors: *Rock, *Concrete, *Projectiles, *Penetration, Bombs, Impact, Terminal ballistics, Boundary value problems.

This report presents several examples of penetration calculations for rigid projectiles impacting concrete and rock targets. The calculations were performed with a computer code which is based on the theory of dynamic cavity expansion in an elastic-plastic compressible continuum. The results of the penetration calculations compare favorably with available data from field experiments and with the results from published finite-difference code calculations. The influence of various target material parameters, different initial impact velocities, and projectile size and shape changes on concrete and rock penetration was also assessed. The accuracy and range of application of the penetration model, however, must still be determined experimentally under more diverse impact conditions.

AD-A016 926/8GA PC$3.25/MF$2.25
Army Armament Command Rock Island Ill
Obscuration Due to Dust of a Laser Beam in a Gun Firing Environment - Preliminary Survey Report.
Technical engineering rept.,
Gerald W. Goble. Oct 75, 20p Rept no. AC-TR-75-003

Descriptors: *Gunfire, *Blast, *Laser beams, *Obscuration, *Atmospheric scattering, Dust, Mie scattering, Muzzle brakes, Particle size, Tanks(Combat vehicles), Aerosols.

A review of the literature addressing the present state-of-the-art research on obscuration due to gun blast is presented. The dynamics of the dust cloud, composition of the dust, theoretical approaches to scattering of laser energy and experimental obscuration measurements are discussed. Papers with significant results on obscuration are presented, and the requirements for further studies are outlined. A bibliography on related gun blast and muzzle brakes studies is included.

AD-A016 944/1GA MF$2.25
Mathematical Applications Group Inc Elmsford N Y
SMITE - A Second Order Eulerian Code for Hydrodynamic and Elastic-Plastic Problems.
Final contract rept.,
Samuel Z. Burstein, Harold S. Schechter, and E. L. Turkel. Aug 75, 160p BRL-CR-255
Contract DAAD05-73-C-0512
Availability: Available in microfiche only.

Descriptors: *Finite difference theory, *Computer programs, *Terminal ballistics, *Input, Hydrodynamics, Elastic properties, Plastic properties, Materials.
Identifiers: SMITE computer program.

A computer code for hydrodynamic and elastic-perfectly plastic problems is described. The model uses a second order finite difference method based upon a Eulerian formulation of the basic differential equations. The algorithm uses an individual grid for each material domain, determined by Lagrangian type boundary points which are subject to free surface and interface conditions. The only communication between domains is through their common interfaces.

19E. Fire Control and Bombing Systems

AD-A016 864/1GA PC$3.75/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
Gunner Errors When using the M72A2 LAW Sight.
Final rept.,
Dominick J. Giordano. Aug 75, 47p Rept no. HEL-TM-19-75

Descriptors: *Rocket sights, *Gunners, Combat effectiveness, Antitank weapons, Human factors engineering, Performance(Human), Errors, Army training, Individualized training, Factor analysis, Difficulty, Aiming, Job analysis, Surface to surface, Range finding, Combat effectiveness, Army personnel, Infantry.
Identifiers: M-72 rockets, LAW(Light Antitank Weapons), Light Antitank Weapons.

An experiment was conducted to: (1) measure the accuracy of infantry LAW gunners performing the aiming tasks necessary to achieve effective fire with the M72A2 Light Antitank Weapon (LAW); and (2) determine whether gunner errors arose primarily from insufficient training, or from the complicated nature of the tasks themselves. Three groups of infantry advanced individual training (AIT) graduates, two of which had just received refresher training on the M72A2 LAW, were interviewed and tested on a mock-up of a LAW sight. The performance test required each subject to estimate the range to targets using stadia lines, and then to position the target in the sight mock-up in the correct manner to achieve a hit. Subjects who had received the refresher training were significantly more accurate in the performance tasks, and expressed more confidence in their ability to use the M72A2 sight effectively, than the subjects who had not; however, even the subjects who had received additional training made a substantial number of serious errors. It is concluded that the human performance tasks necessary to use the M72A2 LAW sight are complicated enough that inadequately trained gunners will make frequency and sizeable errors, thus significantly reducing the battlefield effectiveness of the LAW weapon system. Recommendations are proposed for improving training in these tasks.

19F. Guns

AD-A016 580/3GA PC$3.75/MF$2.25
Institute for Defense Analyses Arlington Va Systems Evaluation Div
Design of Preliminary Tests, Probability of Hit by Antiaircraft Guns,
J. R. Transue, and J. A. Ross. Aug 72, 27p Rept no. P-897 WSEG-191, IDA/HQ-72-14505
Contract DAHC15-67-C-0012

Descriptors: *Antiaircraft guns, *Hit probabilities, Antiaircraft gunnery, Test methods, Test equipment, Instrumentation, Ballistic trajectories.

WSEG/IDA has studied the feasibility of determining the probability of hit of antiaircraft guns firing at aircraft in a test and evaluation program. That study concluded that the test and evaluation program should include three preliminary tests--a tilt test, a scoring system experiment, and a ballistics verification test. This report presents a proposed design for each of the preliminary tests. Each test design includes the objective and test approach, the instrumentation approach, the weapon types and target types, and the test conditions.

AD-A016 899/7GA PC$4.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
An Accelerator Technique for the Study of Ballistic Surfaces.
Final rept.,
A. Niiler, J. E. Youngblood, S. E. Caldwell, and T. J. Rock. Aug 75, 65p Rept no. BRL-1815

Descriptors: *Gun barrels, *Test methods, Wear, Erosion, Surfaces, Diagnosis(General), Acceleration, Nuclear reactions, Computer programs.
Identifiers: Wear tests, PROFILE computer program.

Specific nuclear reactions produced by energetic accelerator beams can be used to detect the presence of various elements on ballistic surfaces. A technique using the reaction 16O(d, alpha sub o) 14N has been developed in order to detect oxygen depth concentration profiles on the surface of a thick slab of iron. Tests with idealized thin oxygen targets have been carried out to show the capabilities of the technique. The detectability level achieved is 2 x 10 to the 16 power atoms/sq cm which corresponds to about 10 atomic layers, the probing depth is 5 micrometers at a deuteron bombarding energy of 3 MeV, and the optimum depth resolution is about 100 A. Iron surfaces which have been exposed to the erosive environments of burning propellants have also been examined. The results of these tests show that significant differences in the oxygen depth concentration profiles are observed for surfaces which have undergone different exposure histories.

N75-31395/7GA PC$3.75/MF$2.25
Arbeitsgruppe fuer Ballistische Forschung, Weil am Rhein (West Germany).
Investigation of Flow Phenomena Associated with the Muzzle Flash of Small Caliber Guns.
G. A. Schroeder, and G. Klingenberg. Nov 74, 39p ABF-E-2/74
Conf-Presented at the 1ST Intern. Symp. On Ballistics, Orlando, Fla., 13-15 Nov. 1974.

Descriptors: *Absorption spectroscopy, *Gas flow, *Guns (Ordnance), *Prandtl-meyer expansion, *Shadowgraph photography, Gun propellants, Line spectra, Shock fronts, Similarity theorem, Spectrum analysis.

For abstract, see STAR 1322

20. PHYSICS

20A. Acoustics

AD-A016 629/8GA PC$4.25/MF$2.25
Stanford Research Inst Menlo Park Calif
A Computer Code to Calculate the Effect of Internal Waves on Acoustic Propagation.
Technical rept.,
Stanley M. Flatte, and Frederick D. Tappert. Mar 75, 62p Rept no. SRI-JRS-74-3
Contract DAHC15-73-C-0370, ARPA Order-2504

Descriptors: *Internal waves, *Acoustics, *Sound transmission, *Computer programs, Oceans, Underwater sound, Propagation, Oscillation, Computerized simulation, Hydrophones, Numerical analysis.

The signal received by a hydrophone in the ocean many kilometers from a steady sound source fluctuates dramatically due to variations of the speed of sound in sea-water. A computer code that simulates the passage of acoustic CW signals through an ocean with internal waves is written. The code generates a sound-speed field from an internal-wave spectrum that has been derived from oceanographic measurements. The acoustic propagation is achieved through the use of the parabolic-equation approximation. The code is limited fundamentally to acoustic frequencies above approximately 10 Hz, and by practical computer-time constraints to frequencies below approximately 400 Hz. The code allows the calculation of the amplitude and phase of the full acoustic field as a function of depth and range at any desired time. (Author)

AD-A016 630/6GA PC$3.75/MF$2.25
Stanford Research Inst Menlo Park Calif
Low-Frequency Sound Propagation in a Fluctuating Infinite Ocean. II.
Technical rept.,
F. Zachariasen. Jun 75, 30p Rept no. SRI-JSR-74-6
Contract DAHC15-73-C-0370, ARPA Order-2504
See also AD-787 041.

Descriptors: *Sound transmission, *Internal waves, *Underwater sound, Low frequency, Oceans, Propagation, Oscillation, Numerical analysis.

An approximation method for calculating fluctuations due to internal waves in sound propagation in the ocean is outlined, including the effects of the sound channel. Results are presented in a simple form in which the geometrical optics limit is transparent. (Author)

AD-A016 659/5GA PC$3.75/MF$2.25
Middleton (David) Cambridge Mass
A new Approach to Scattering Problems in Random Media.
Technical research rept. Jan-Jun 75,
David Middleton. Jun 75, 40p
Contract N00014-70-C-0198
See also reports dated Dec 74, AD-A014 111 and AD-A014 112.

Descriptors: *Underwater sound, *Acoustic scattering, *Multivariate analysis, Doppler effect, Stochastic processes, Information theory, Mathematical models.

A new approach to scattering of radiation from random media and interfaces is outlined. Topics discussed include the following: Model of a differential scattering element; Statistical properties of the dN(Z)M moments; Langevin equations and the scattered field; an example. Acoustic scattering from the random moving ocean surface.

AD-A016 739/5GA PC$3.25/MF$2.25
Rensselaer Polytechnic Inst Troy N Y Dept of Mathematics
Acoustic Phase Fluctuations resulting from Axis Meander and Transport Variation of a Geostrophic Ocean Current.
Technical rept.,
M. J. Jacobson, and J. A. Widtfeldt. 9 May 75, 13p Rept no. RPI-Math-108
Contract N00014-67-A-0117-0002
Availability: Pub. in Jnl. Acoustical Society of America, v58 n2 p376-384 Aug 75.

Descriptors: *Underwater sound, *Ocean currents, *Acoustic velocity, Ocean environments, Ray tracing, Ocean models, Equations of motion, Continuous waves, Sound transmission, Phase shift, Acoustic reflection, Acoustic refraction, Ocean bottom, Transport properties, Fluid dynamics, Coriolis effect, Boundary value problems, Reprints.
Identifiers: Geostrophic currents, Meanders, Parabolic differential equations.

A treatment is presented for total-field phase fluctuations of a cw signal, transmitted across a slowly varying northward geostrophic flow. Only refracted/bottom-reflected rays are considered, and the ocean bottom is horizontal. Unlike earlier investigations, the flow is of finite width, and transport-axis location, as well as volume transport, may be varied. We begin with a rather general current model having factorable dependence on depth and distance across the flow. The current is taken to decrease linearly with depth, and the surface current is specialized to a cubic polynomial. Sound speed is calculated from the density and pressure solutions. It is then approximated by a linear least-squares fit, so that that the acoustics problem is equivalent to that in a convergent channel with linear sound speed versus depth. In an application, the total-field phase is shown to be highly sensitive to transport-axis meander as well as to changes in volume transport. (Author)

AD-A016 748/6GA PC$3.25/MF$2.25
Georgetown Univ Washington D C Dept of Physics
Rayleigh and Lamb Waves at Liquid-Solid Boundaries.
Technical rept. 1 Jun 75-30 Sep 75,
T. J. Plona, M. Behravesh, and W. G. Mayer. 28 Oct 75, 5p Rept nos. GUUS-09754, TR-4
Contract N00014-75-C-0333
Availability: Pub. in Ultrasonics, p171-174 Jul 75.

Descriptors: *Rayleigh waves, Surface waves, Propagation, Sound transmission, Liquids, Solids, Boundary value problems, Velocity, Equations, Reprints.
Identifiers: Lamb waves.

Equations for free and for liquid-loaded solid boundary Rayleigh and Lamb wave propagations are examined. Examples are given to show when the free-solid approach to wave velocities can be used to find the sound velocities of Rayleigh and Lamb waves on liquid-loaded solids. (Author)

AD-A016 814/6GA PC$3.75/MF$2.25
Naval Undersea Center San Diego Calif
Acoustic and Related Properties of the Sea Floor: Shear Wave Velocity Profiles and Gradients.
Research and development rept. Jan-Jun 75,
Edwin L. Hamilton. Jul 75, 34p Rept no. NUC-TP-472

Descriptors: *Sound transmission, *Sediments, *Secondary waves, *Bottom loss, Acoustic velocity, Sand, Clay, Silt, Saturation, Attenuation, Boundaries, Depth, Hydrostatic pressure, Field tests, Laboratory tests, Shear properties, Acoustic properties, Porosity, Sonar equipment, Mathematical prediction, Acoustic data.
Identifiers: Shear modulus, Turbidites.

Measurements of the velocity of shear waves at various depths in common watersaturated sediments were collected from published studies. Because measurements in marine sediments are rare, most of this information came from land geology and geophysics. This report considered the two end-member sediments types: sand and silt-clays, including turbidites which are alternating layers of silt-clay with thinner layers of silt and sand. The shear velocity measurements in sands were 29 selected, in situ values at depths to 12m. Data from laboratory and field studies indicate that shear wave velocity is proportional to the 1/3 to 1/6 power of pressure or depth in sands; that the 1/6 power is not reached until very high pressures are applied; and that for most sand bodies the exponent is between 3/10 and 1/4. Data from laboratory studies allow prediction of compressional wave (sound) as a function of depth in sands. The shear velocity measurements in silt-clays and turbidites used in this report include 47 measurements to depths of 650 m. Three linear equations were used to characterize the data. The shear velocity gradient in the upper 40m(4.65/sec) is 4-5 times greater than is the compressional wave (sound) velocity gradient in comparable sediments. At deeper depths, shear velocity and compressional velocity gradients are comparable. This report concludes with methods for prediction of shear wave velocity profiles and gradients in sea-floor sediments. This result will be of immediate use in a sophisticated model that determines sound energy losses when an acoustic wave interacts with the sea floor.

AD-A016 830/2GA PC$4.25/MF$2.25
Rensselaer Polytechnic Inst Troy N Y Dept of Mathematical Sciences
Deep-Ocean Dynamics for Environmental-Acoustics Models.
Technical rept.,
J. G. Watson, W. L. Siegmann, and M. J. Jacobson. 15 Nov 75, 55p Rept no. RPI-Math-110
Contract N00014-67-A-0117-0002

Descriptors: *Acoustic velocity, *Ocean currents, Hydrodynamics, Rossby waves, Thermodynamics, Approximation, Deep water, Deep oceans.

A hydrodynamic model for flows in the deep ocean is developed in order to determine the celocity field and sound-speed distribution for use in acoustic transmission problems. A scaling of the governing equations is constructed that explicity includes sound speed. A subsequent pertubation expansion yields a set of approximate equations for motions nearly in geostrophic and hydrostatic balance, such as large-scale, quasi-steady currents and Rossby waves. The stream function for these flows is shown to satisfy either the quasi-geostrophic potential vorticity equation or a simpler limiting case of this equation. The results of the analysis are used to obtain a significant simplification of the ray equations of geometrical acoustics for moving media. For the particular class of flows considered here, the model equations are ap-

plicable if the ocean depth is about 1 km or greater and if the spatial and temporal scales of variation of the motions are of the order of 100 km and 10 days, respectively. A solution for a flow such as the Antilles current is derived. Isospeed curves for this solution are shown in a plane perpendicular to the current, and specific features of the curves are discussed and interpreted.

AD-A016 847/6GA PC$3.75/MF$2.25
Saclant ASW Research Centre La Spezia (Italy)
The use of the Parabolic Equation Method in Sound Propagation Modelling.
Finn Jensen, and Hans Krol. 15 Aug 75, 50p
Rept no. SACLANTCEN-SM-72

Descriptors: *Underwater sound, *Partial differential equations, Ray tracing, Shallow water, Deep Water, Fourier transformation, Acoustic detection, Acoustic attenuation, Mathematical models, Computer programs, FORTRAN, Italy.
Identifiers: *Parabolic differential equations, Fast Fourier transform.

The parabolic equation method (PE method) is the latest major development in the field of acoustic modelling. A detailed description of the derivation of the parabolic equation from the wave equation is given together with a description of a marching solution technique based on Fast Fourier Transforms (FFT). Limitations on the method in terms of allowable step length in range, number of FFT points to be used, and restrictions on pressure field behaviour in order to obtain a stable solution, are mentioned. Furthermore, numerical examples of propagation predictions are given for both shallow and deep water cases, with and without bottom absorption, and for both range-dependent and range-independent environmental conditions.

AD-A016 967/2GA PC$3.75/MF$2.25
Rensselaer Polytechnic Inst Troy N Y Dept of Mathematical Sciences
Acoustic Analysis for a Moving Source with Application to an Isospeed Ocean.
Technical rept.,
G. M. Jacyna, M. J. Jacobson, and J. G. Clark. 1 Oct 75, 41p Rept no. RPI-Math-109
Contract N00014-67-A-0117-0002

Descriptors: *Underwater sound, *Ray tracing, Acoustic fields, Acoustic velocity, Continuous waves, Doppler effect.

Using ray theory, a general analysis is presented for the treatment of the effects of sound-source motion on the total acoustic field at a fixed receiving point. Sound speed is depth-dependent and the cw source follows an arbitrary path with arbitrary velocity. The received signal is interpreted as a waveform of arbitrary frequency whose amplitude and phase are time-dependent. Application of the theory is made to a constant sound-speed channel in which the source follows a short straight-line path with constant speed, and a linearized acoustic model is developed. Both primary and cumulative acoustic phase are examined as functions of time for various source-trajectory direction. An averaged Doppler-shift frequency, as well as unaveraged source frequency, is considered. Maximum phase change occurs for radial source motion and minimum change occurs for circumferential motion. Finally, acoustic phase is investigated when the source follows a long straight-line path. An approximate formula is derived for cumulative phase, which is found to be a hyperbolic function of time.

COM-75-11399/3GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C. Applied Acoustics Section.
Procedures for Estimating Sound Power from Measurements of Sound Pressure. An Experimental Investigation with Application to Noise from Portable Air Compressors.
Final rept. Feb 74-Dec 74,
Curtis I. Holmer. Jan 75, 79p* NBSIR-75-652
EPA/550/8-76-001

Descriptors: *Compressor noise, Power spectra, Sound pressure, Noise(Sound), Pollution, Measurement, Air compressors, Tests.
Identifiers: Noise pollution, Sound power.

The report describes investigations of the accuracy and precision of various measurement methodologies for determining the estimated sound power output of 'large' machines in the free field over a reflecting plane. One purpose of this investigation is to place empirical error bounds on many of the free field measurement procedures currently proposed or in use; and in particular, compare the results of near-field and far-field measurements. The sources used for the investigation included 17 portable air compressors of various types (powered by internal combustion engines), a reference sound source, and a loudspeaker driven by a pure tone source. The data recorded include sound pressure level (A-weighted, linear, and 1/3-octave band) on an 84 point hemispherical array of seven metre radius, and near-field measurements, sampled every square metre, on a rectangular surface one metre from the machine surface. These data were reduced to provide information on the deviation of near-field sound power determinations from far-field power level (using subsets of the data as appropriate to various methodologies).

COM-75-50556/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Noise Power Emission Level for Production Designation.
Final rept.,
W. W. Lang, and D. R. Flynn. Jun 75, 6p
Pub. in Noise Control Eng., v4 n3 p108-113 May/Jun 75.

Descriptors: *Machinery, *Noise analyzers, Sound transmission, Acoustics, Power spectra, Sound pressure.
Identifiers: Reprints, *Sound power, *Machinery noise.

A brief discussion is given of some of the advantages of using sound power rather than sound pressure at a particular location to describe the noise emission from a particular source. To avoid confusion between sound pressure levels and sound power levels, both of which are usually expressed in decibels, it is proposed that in communications with users, the sound power levels of stationary sources be expressed in terms of Noise Emission Number, which is numerically equal to the A-weighted sound power level expressed in bels rather than decibels.

COM-75-50569/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Free-Field Method for Sound-Attenuation Measurement.
Final rept.,
Gale R. Hruska, and Walter Koidan. Aug 75, 3p
Pub. in Jnl. of the Acoustical Society of America, v58 n2 p507-509 Aug 75.

Descriptors: *Acoustic attenuation, *Ultrasonic frequencies, Measurement.
Identifiers: Reprints.

A free-field method is described for measuring the attenuation of sound at ultrasonic frequencies. It makes use of the systematic deviation from the inverse square law caused by attenuation when a sound receiver is drawn away from a sound source. Measurements of attenuation from 20 to 100 kHz, made in air in a small anechoic chamber under ambient environmental conditions, were in good agreement with theoretical calculations. The sum of the distances between the acoustic centers of the transducers and the vibrating elements is obtained as a by-product of the procedure.

N75-31109/2GA PC$4.25/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Calculation of Bang Propagation in Real Atmosphere: Focalization Geometry for Concorde Ascent Law and Bang Intensity Near the Longitudinal and Lateral Extinctions Calcul Dela Propagation du Bang en Atmosphere Reelle: Position Geometrique de la Focalisation pour la Loi de Montee de Concorde Intensite du Bang au Voisinage des Extinctions Longitudinale et Laterales.
M. Schaffar, and F. Schlosser. 26 Apr 74, 74p
ISL-11/74
Contract DRME-73/191
Language in French.

Descriptors: *Climbing flight, *Concorde aircraft, *Noise intensity, *Shock wave propagation, *Sonic booms, Acoustic velocity, Computation, Jet aircraft noise, Laws, Supersonic flight, Temperature effects, Wind effects.

For abstract, see STAR 1322

N75-31731/3GA PC$7.50/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Noise and Speech Interference: Proceedings of Minisymposium.
W. T. Shepherd. Sep 75, 230p NASA-TM-X-72696

Descriptors: *Conferences, *Noise pollution, *Psychoacoustics, *Verbal communication, Aircraft noise, Psychological tests, Speech recognition, Telephony, Television reception.

For abstract, see STAR 1322

N75-31855/0GA PC$3.25/MF$2.25
Laboratorio de Acustica e Sonica, Sao Paulo (Brazil).
Whistle Noise in Residence, Measurements and Suggestion for Masking the Noise.
L. X. Nepomuceno. 16 May 75, 5p REPT-7505.785
In Portuguese; English Summary.

Descriptors: *Noise pollution, *White noise, Audiometry, Noise measurement, Noise spectra.

For abstract, see STAR 1322

N75-31856/8GA PC$3.25/MF$2.25
Pennsylvania State Univ., University Park.
The Propagation of Plane Waves and Higher Order Acoustic Modes in Multisectioned Ducts.
B. R. Wyerman, and G. Reethof. 25 Sep 75, 14p
NASA-CR-143438
Contract NGL-39-009-121

Descriptors: *Acoustic ducts, *Acoustic propagation, *Sound transmission, *Sound waves, Acoustic attenuation, Acoustic impedance, Microphones, Sound generators.

For abstract, see STAR 1322

PATENT-3 831 137 Not available NTIS
Department of the Navy Washington D C
Acousto-Optic Underwater Detector.
Patent,
Frank W. Cuomo. Filed 14 Apr 72, patented 20 Aug 74, 5p Rept nos. PAT-APPL-246 092,

Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Hydrophones, *Transducers, *Patents, Acoustooptics, Fiber optics, Underwater sound equipment, Underwater communications.
Identifiers: PAT-CL-340-8-R.

The patent describes a low frequency or pressure-gradient hydrophone comprising an optical reflector experiencing displacements responsive to acoustic waves. A beam light from a light source is carried by a first group of of fiber optics guides and is incident upon the optical reflector. The light reflected from the reflector is carried by a second group of fiber optics guides to a light detector. Any displacements of the reflector due to pressure gradient due to acoustic waves impinging on the opposite sides of the reflector are detected by changes in intensity of reflected light from the light source.

20B. Crystallography

AD-A016 696/7GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Crystallization of Amorphous Silicon Films by Nd:YAG Laser Heating.
Journal article,
John C. C. Fan, and Herbert J. Zeiger. 6 May 75, 4p Rept no. JA-4511 ESD-TR-75-272
Contract F19628-73-C-0002
Availability: Pub. in Applied Physics Letters, v27 n4 p224-226, 15 Aug 75.

Descriptors: *Crystallization, Neodymium lasers, Heating, Amorphous materials, Silicon, Films, Focusing, Infrared radiation, Laser beams, Photovoltaic effect, Reprints.

We have converted amorphous Si films into crystalline Si by heating with focused Nd:YAG laser radiation. The films were scanned by a focused laser beam and then studied by reflection electron microscopy and x-ray diffraction. These studies indicate that crystalline sizes as large as 25 micrometers were produced and suggest that a crystalline technique using a scanned laser beam focused to a slit image could be useful in preparing large-grain Si films for photovoltaic cells. (Author)

AD-A016 702/3GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Crystal Structure of NdLiP4O12.
Journal article,
Henry Y-P. Hong. 5 May 75, 8p Rept no. JA-4502 ESD-TR-75-237
Contract F19628-73-C-0002
Availability: Pub. in Materials Research Bulletin, v10 n7 p635-640 1975.

Descriptors: *Neodymium compounds, *Lithium compounds, *Phosphates, *Crystal structure, *Fluorescence, X ray diffraction, Neodymium lasers, Quenching(Inhibition), Lasers, Reprints.

A single-crystal x-ray diffraction analysis has been performed on NdLiP4O12 synthesized by a flux method. The structure is monoclinic, with space group C 2/c, Z=4, and cell parameters a = 16.408 (3), b = 7.035 (4), c = 9.729 (4) A, and beta = 126.38 (5) degrees. A full-matrix, least squares refinement gave R = 0.072, Rw = 0.077 for 590 independent reflections. The basic structural units are helical ribbons, (PO3) sub N, formed by corner-sharing of PO4 tetrahedra. The NdO8 dodecahedra are isolated from each other in the sense that they do not share any O atoms. This isolation accounts for the marked reduction in the concentration quenching of Nd(+3) fluorescence that is observed for NdLiP4O12. The shortest Nd-Nd distance is 5.620 A, and the concentration of Nd(+3) ions is 4.42 x 10 to the 21st power/cc. (Author)

AD-A016 707/2GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Observation of a Very Narrow Surface Resonance on Single-Crystal Aluminum.
Journal article,
Victor E. Henrich. 31 Jan 75, 7p Rept no. JA-4481 ESD-TR-75-234
Contract F19628-73-C-0002
Availability: Pub. in Surface Science, v49 p675-680 1975.

Descriptors: *Single crystals, *Resonance, Scattering, Surfaces, Aluminum, Low energy, Electron diffraction, Electrons, Elastic properties, Reprints.

We report here the observation of a very narrow resonance in the electron reflection spectrum of single-crystal aluminum that occurs only at the condition for simultaneous grazing emergence of a complete set of degenerate diffracted beams. Its amplitude has a strong dependence on both the energy and orientation of the incident-electron beam and is very sensitive to the perfection of the crystal surface. It does not have the properties of a surface barrier resonance, nor does it behave in the manner that we expect for a simple superposition of beam threshold effects. (Author)

AD-A016 735/3GA PC$3.25/MF$2.25
Washington Univ St Louis Mo
Interpretation of Domain Nucleation Measurements: Neel Phase Theory and Micromagnetism.
Technical rept.,
M. W. Muller, and M. H. Yang. 5 Mar 75, 6p
Contract N00014-67-A-0445-0005, Grant NSF-GH-32000
Availability: Pub in IEEE Transactions on Magnetics, vMag-11 n5 p1385-1387 Sep 75.

Descriptors: *Magnetic domains, *Epitaxial growth, *Nucleation, Thin films, Garnet, Anisotropy, Theory, Reprints.
Identifiers: *Micromagnetism, Magnetoelastic properties, Neel phase theory.

The observed conditions for homogeneous second-order stripe domain nucleation in uniaxial garnet films has previously been interpreted by a generalization of Neel's 1946 phase theory that yields values of the anisotropy constants from the observations. We show that a micromagnetic description of the phenomena yields additional detailed predictions of the domain orientation. These can be correlated with the films' anisotropic and magnetoelastic properties. The predicted behavior is consistent with earlier observations reported in the literature, and provides a good description of new measurements reported here. (Author)

AD-A016 737/9GA PC$3.25/MF$2.25
Washington Univ St Louis Mo
Field Control of Magneto-Optic Gratings.
Technical rept.,
M. W. Muller, S. K. Chung, and M. H. Yang. 24 Mar 75, 6p
Contract N00014-67-A-0445-0005, Grant NSF-GH-32000
Availability: Pub. in IEEE Transactions on Magnetics, vMag-11 n5 p1121-1123 Sep 75.

Descriptors: *Magnetooptics, *Magnetic domains, *Gratings(Spectra), *Epitaxial growth, Garnet, Substrates, Magnetic fields, Anisotropy, Reprints, Films.

The Faraday or Kerr rotation of the plane of polarization of light incident on adjacent magnetic domains has opposite sense. Thus light transmitted through a film containing stripe domains or reflected from it is diffracted, as by a grating. The period of such a grating can be controlled by the application of a uniform magnetic field. We report on experimental and theoretical work that explores the range of grating field control under quasistatic conditions, using real films, specially (111) oriented magnetic garnet films epitaxially grown on GdGa garnet substrates. The effects of the cubic and/or the tilt anisotropy on the grating control range are discussed. (Author)

AD-A016 821/1GA PC$6.25/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
The Lattice Dynamics of Zinc from a Generalized First Principles Pseudopotential Approach.
Technical memo.,
Janda K. G. Panitz. 26 Feb 75, 177p Rept no. TM-75-37
Contract N00017-73-C-1418

Descriptors: *Crystal lattices, *Dynamics, *Metal crystals, *Zinc, Phonons, Spectra, Electron gas, Electrons, Elastic properties, Shear stresses, Constants, Eigenvectors, Experimental data, Mathematical models, Wave functions, Theses.
Identifiers: *Pseudopotential theory.

The elastic shear constants, and phonon dispersion curves in three symmetry directions, are calculated for zinc and compared to experimental values. Harrison's generalized first principle pseudopotential theory in the second order, nonlocal form is used to calculate the electron gas modified ion-ion interaction energy. This 'generalized' pseudopotential method is applicable to d-band metals in that the usual small core approximation is relaxed so as to effectively include the effects of hybridization. The effects of including and ignoring hybridization are compared. The delocalized nature of the metallic d-states is also considered in the calculation of the conduction-core exchange energy. Good agreement between theory and experiment is obtained for the phonon spectra curves. Agreement between theory and experiment for the elastic shear constants is fair. (Author)

AD-A016 873/2GA PC$3.75/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Guidance and Control Directorate
Relationships between the Dielectric Constant, Refractive Index and Hysteresis in Crystal Structures.
Technical rept.,
J. E. Brown. 18 Jul 75, 25p Rept no. RG-74-18

Descriptors: *Crystal structure, *Dielectrics, *Refractive index, *Hysteresis, *Ferroelectric crystals, Crystals, Dielectric properties, Constants, Electric fields, Light transmission, Barium titanates, Perovskites, Equations, Mathematical models.

This report describes the relationships of the dielectric constant and refractive index in crystal structures. It is an attempt, using existing literature, to investigate through conventional means, possible measurement and use of the speed of light in crystal structures. The attempt is made to establish the possibility of measuring crystal characteristics by applying an electric field and measuring the effect on light transmission. This appears possible because of the hysteresis effects that exist in crystal type structures. (Author)

20C. Electricity and Magnetism

AD-A016 519/1GA PC$3.25/MF$2.25
Texas Univ At Austin Electronics Research Center
High-Frequency Pyromagnetic Effect in CoS sub 2-x Se sub x Compounds,
M. L. Malwah, R. W. Bene, and R. M. Walser. 18 Nov 74, 8p AFOSR-TR-75-1458
Contract F44620-71-C-0091
Availability: Pub. in Jnl. of Applied Physics, v46 n5 p2250-2256 May 75.

Descriptors: *Ferromagnetic materials, Curie temperature, Magnetic fields, Losses, Cobalt compounds, Sulfides, Selenides, High frequency, Doping, Selenium, Reprints.
Identifiers: *Pyromagnetic effects, *Surface magnetic states, Cobalt sulfide selenide, Bulk properties, Alternating fields.

In this paper we present the results of the pyromagnetic measurements on CoS (2-x) Se (x) in the frequency range 100 Hz-10 MHz. The effect of the eddy current losses on the frequency response behavior is calculated and seems to explain the experimental data fairly well. The high-frequency response measurements also reveal in these compounds the presence of a surface magnetic state with a Curie temperature higher than that of the bulk material. The surface Curie temperature as well as the thickness of the surface region depend on the level of selenium doping. The depth of the surface region increases with higher level of selenium doping and varies from about 0.5 to 25 micrometer. The cause for the existence of the surface magnetic state is believed to be the selenium deficiency near the surface. A possible selenium doping profile near the surface consistent with our experimental data is also suggested. (Author)

AD-A016 698/3GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Origin of Secondary-Electron-Emission Yield-Curve Parameters.
Journal article,
Gerald F. Dionne. 11 Mar 75, 6p Rept no. JA-4471 ESD-TR-75-269
Contract F19628-73-C-0002
Availability: Pub. in Jnl. of Applied Physics, v46 n8 p3347-3351 Aug 75.

Descriptors: *Secondary emission, *Work functions, Metals, Surface properties, Platinum, Yield, Photoelectric effect, Thermionic emission, Field emission, Reprints.
Identifiers: *Bulk properties.

From an analysis of the one-dimensional constant-loss theory of secondary electron emission, maximum yield (delta sub m), primary electron energy at maximum yield (Eom), and both crossover energies E(I)oc and E(II)oc are shown to depend on the surface and bulk properties of the emitting material through simple relations. In particular, the results strongly suggest that the first crossover energy can be very dependent on surface properties, whereas the energy at maximum yield is entirely controlled by bulk properties. Refinement of the low-energy part of the reduced yield curve by means of the results of the more realistic three-dimensional theory leads to the development of the expression E(I)oc equals 0.51 Eom (delta sub m) to the minus 1.32 power. Comparison between theory and experiment for several secondary-emitting materials is presented to demonstrate the accuracy of this useful relation. Finally, the implications of these results for different classes of materials are discussed in terms of basic physical properties, such as density, electrical conductivity, work function, and band gap. (Author)

AD-A016 700/7GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
The Influence of Stored Energy at Step Discontinuities on the Behavior of Surface-Wave Gratings.
Journal article,
Robert C. M. Li, and John Melngailis. 11 Oct 74, 11p Rept no. JA-4445 ESD-TR-75-267
Contract F19628-73-C-0002
Availability: Pub. in IEEE Transactions on Sonics and Ultrasonics, vSU-22 n3 p189-198 May 75.

Descriptors: *Energy storage, *Surface waves, Discontinuities, Substrates, Phase shift, Rayleigh waves, Frequency response, Broadband, Gratings(Spectra), Grooving, Reprints.

Energy storage at a groove edge, or similar discontinuity in the substrate surface, produces a phase shift in a surface acoustic wave incident on the discontinuity. Such phase shifts are a major source of phase errors in surface-wave devices employing etched grooves or deposited stripes on the substrate surface. An improved equivalent network, in which this stored energy is represented as a simple shunt susceptence, is presented for a Rayleigh wave normally incident on a step discontinuity on the substrate surface. With this network second-order effects observed at the fundamental frequency of a uniform array of shallow grooves can now be predicted. The presence of stored energy also exerts a profound influence on the wideband harmonic response of the array. In particular, a strong response is predicted at even harmonics of a grating the groove width of which is half the grating period, in contradiction with simpler theories. The validity of this prediction is verified by measurements at the second harmonic, with excellent agreement between theory and experiment. (Author)

AD-A016 732/0GA PC$3.25/MF$2.25
Clarkson Coll of Technology Potsdam N Y Dept of Physics
Magnetic Susceptibility of Chromium-Ruthenium Alloys between 300 and 600 K.
Technical rept.,
Sigurds Arajs, C. A. Moyer, J. R. Kelly, and K. V. Rao. 5 May 75, 7p Rept no. TR-5-75
Contract N00014-70-A-0311-0001
Availability: Pub. in Physical Review B, v12 n7 p2747-2751, 1 Oct 75.

Descriptors: *Antiferromagnetism, *Ferromagnetic materials, Neel temperature, Chromium alloys, Ruthenium alloys, Magnetic moments, Electrical resistance, Binary alloys, Reprints.
Identifiers: *Magnetic susceptibility, Susceptibility.

Magnetic susceptibility chi of chromium-ruthenium alloys containing 0.9-, 2.1-, 3.0-, 4.8-, 6.6-, 8.3-, and 10.1-at.% ruthenium has been measured as a function of temperature T between 300 and 600 K. Each of the chi vs T curves exhibits a well-defined knee at the Neel temperature Tn. Experimental results indicate that there is no localized magnetic moment on ruthenium atoms above Tn. The temperature dependence in the antiferromagnetic region between 350 K and Tn is described by extending the Fedders-Martin theory for itinerant-electron antiferromagnets. (Author)

20D. Fluid Mechanics

AD-A016 325/3GA PC$3.75/MF$2.25
Yale Univ New Haven Conn Dept of Engineering and Applied Science
Nonequilibrium Flow with Condensation,
Peter P. Wegener. 2 Jan 74, 29p Rept no. 33
Contract N00014-67-A-0097-0012
Availability: Pub. in Acta Mechanica, v21 n1/2 p65-91 1975.

Descriptors: *Nonequilibrium flow, *Condensation, *Gas flow, *Two phase flow, Gas dynamics, Clustering, Nozzles, Nucleation, Relaxation, Shock tubes, Vaporization, Compressible flow, Supersonic flow, Turbulent flow, Nozzle gas flow, Shock waves, Supersonic wind tunnels, Reprints.

Diabatic processes dominate compressible flows with phase change where the heat of condensation or vaporization causes changes of enthalpy in the flow. The equations of motion for condensing flows are given in analogy to those of reacting flows and discontinuities are discussed. The nonequilibrium process of condensation by homogeneous nucleation in the supersaturated state is singled out by examples for steady and unsteady nozzle flows. Prandtl-Meyer flow, unsteady expansions and shock waves. A selective guide to the widely dispersed literature is provided and the early history of the discovery of condensation in supersonic wind tunnels is recounted. (Author)

AD-A016 371/7GA PC$3.75/MF$2.25
Advisory Group for Aerospace Research and Development Paris (France)
Computation of Viscous Compressible Flows based on the Navier-Stokes Equations,
Roger Peyret, Henri Viviand, and J. J. Smolderen. Sep 75, 50p Rept no. AGARD-ograph-212
NATO furnished.

Descriptors: *Viscous flow, *Compressible flow, *Navier Stokes equations, Computations, Finite difference theory, Shock waves, Aerodynamics, Leading edges, NATO.

Problems relating to the computation of viscous compressible flows based on numerical solutions of the Navier-Stokes equations are reviewed. A general introduction to the Navier-Stokes equations and a discussion of their interest in aerodynamic problems are first presented. Then the following aspects of numerical methods are considered: limitation of the computational domain and boundary conditions on the outer boundary; various approaches in finite difference methods and description of some representative schemes; treatment of boundary conditions at a solid wall; treatment of shock waves, and general considerations on accuracy and computing times. Finally reported computations of two-dimensional or three-dimensional flows are presented in table form with summary indications on the problems treated and the methods used.

AD-A016 396/4GA PC$3.75/MF$2.25
Arnold Engineering Development Center Arnold Air Force Station Tenn
Ablation and Viscous Effects on the Force and Moment Characteristics of Slender Cone Models at Mach 10 under Laminar Flow Conditions.
Final rept. 1 Jul 73-31 Jan 75,
B. J. Griffith, W. T. Strike, and B. M. Majors. Oct 75, 36p Rept no. AEDC-TR-75-109
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn. Rept. no. ARO-VKF-TR-75-39.

Descriptors: *Hypersonic flow, *Ablation, *Conical bodies, Slender bodies, Simulation, Hypersonic wind tunnels, Model tests, Viscous flow, Laminar flow, Angle of attack, Blunt bodies, Porous materials, Blowers.
Identifiers: Camphor, Blowing.

A comprehensive wind tunnel investigation was conducted at Mach number 10 on 4- and 5-deg half-angle cones in order to study ablation and viscous effects under laminar flow conditions. Attention was focused on (1) the mode of ablation simulation, (2) obtaining consistent pitch plane force measurements in the angle-of-attack range from 0 to 4 deg, (3) the effect of

bluntness, and (4) viscous effects over as large a Reynolds number range as possible. The subliming ablator used was camphor, which is compared to blowing through a porous surface using (1) nitrogen, (2) argon, and (3) sulphur hexafluoride (SF6) gases.

AD-A016 457/4GA PC$5.25/MF$2.25
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
An Analysis of Heat Transfer on a Joukowski Airfoil with Separation and Reattachment.
Interim rept. 1 Jan 73-1 Mar 75,
Lucien Louis DeBruge. Jul 75, 120p Rept no. AFAPL-TR-75-28

Descriptors: *Fluid dynamics, *Heat transfer, *Turbomachinery, Airfoils, Flow separation, Bubbles, Comparison, Cross flow, Potential flow, Mathematical models, Cylinders, Laminar boundary layer.
Identifiers: Flow reattachment, Nusselt number.

The problem of separation bubbles in subsonic flow has been the object of much attention because of its incidence on the performance of turbomachinery and airfoils in general. An analytical method depicting a two-dimensional incompressible, steady-state flow over the convex side of a Joukowski airfoil on which a large separation bubble has developed is formulated. This method uses a potential flow configuration in cross flow and two equal but opposite vortices at rest behind the cylinder. The vortex strength generating the flow recirculation inside the bubble and the perturbation of the inviscid velocity distribution outside the separation bubble are so chosen that the calculated separation in cross flow occurs at a Reynolds number of 100,000. The average heat transfer coefficient obtained is compared with predicted values of flow separation over a cavity.

AD-A016 469/9GA PC$4.25/MF$2.25
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
Two-Dimensional Shock Wave Boundary Layer Interactions.
Final rept. Feb 73-Sep 74,
Robert G. Christophel. Jul 75, 61p Rept no. AFFDL-TR-74-152

Descriptors: *Boundary layer flow, *Shock waves, *Hypersonic characteristics, Interactions, Viscous flow, Model tests, Test methods, Test facilities, Data reduction, Correlation techniques, Flow visualization.
Identifiers: *Shock wave interactions.

A wind tunnel test was conducted in the Air Force Flight Dynamic Laboratory's High Temperature Facility to investigate the two-dimensional shock wave boundary layer interaction produced by a remote shock generator-receiver configuration. The program was conducted at a free stream Mach number of 10 and over a unit Reynolds number range of 150000 to 600000 per foot. The receiver plate pitch angle was 0 deg except for a portion of the program when the receiver plate was pitched to 6 deg compression to produce a local Mach number of 8 and a corresponding unit Reynolds number range of 500000 to 2.2 million per foot. The generator plate deflection angle range was from 0 deg to 8 deg.

AD-A016 535/7GA PC$3.75/MF$2.25
Advanced Technology Labs Inc Westbury N Y
Compressibility Effects in Free Turbulent Shear Flows,
S. Dash, G. Weilerstein, and R. Vaglio-Laurin. Aug 75, 38p Rept no. ATL-TR-220 AFOSR-TR-75-11436
Contract F44620-75-C-0074

Descriptors: *Turbulent flow, *Shear properties, *Compressive properties, Gas flow, Compressible flow, Mathematical models, Computer applications, Mixing, Entrainment, Velocity, Experimental data, Comparison.
Identifiers: *Shear flow, Shear layers, Velocity profiles.

A heuristic model of compressibility effects stipulates that the fluctuating pressure-strain correlation acts to reduce the effective turbulent viscosity at the general axial station x in a compressible free shear flow by an amount uniquely dependent upon the rms Mach number fluctuation. Accordingly, the turbulent viscosity is related to the turbulent kinetic energy and the turbulent energy dissipation rate. Numerical predictions are generated for a number of standard test cases involving heterogeneous and non-equilibrium flows. Comparisons between these predictions and the experimental data are made.

AD-A016 536/5GA PC$3.75/MF$2.25
Aeronutronic Ford Corp Newport Beach Calif Aeronutronic Div
Hydrodynamic Stability and Transition to Turbulence in the Hypersonic Boundary Layer over a Sharp Cone.
Interim rept. 1 Oct 74-30 Jun 75,
Anthony Demetriades. Jul 75, 49p AFOSR-TR-75-1435
Contract F44620-75-C-0016

Descriptors: *Conical bodies, *Hypersonic characteristics, *Boundary layer transition, Sharp bodies, Laminar flow, Turbulence, Stability, Oscillation, Periodic variations, Hot wire anemometers, Instability, Reynolds number, Waveforms.

Periodic oscillations have been observed in the laminar boundary layer of a sharp tipped, 5-degree adiabatic cone immersed in a stream of Mach no. 8. These oscillations have been photographed with a spark shadowgraph system and probed with a hot-wire anemometer. Evidence indicates that the waves are due to a hydrodynamic instability of the Tollmien-Schlichting type, active in the 2 million Reynolds no. Various factors involved are discussed.

AD-A016 570/4GA PC$5.75/MF$2.25
Naval Postgraduate School Monterey Calif
Unsteady Supersonic Cascade Theory Including Nonlinear Thickness Effects.
Master's thesis,
William Richard Chadwick. Jun 75, 131p

Descriptors: *Fluid dynamics, *Supersonic characteristics, *Gas turbines, Cascades(Fluid dynamics), Nonuniform flow, Theory, Thickness, Wedges, Oscillation, Numerical methods and procedures, Problem solving, Flat plate models, Mathematical models, Theses.

Several problems are treated which arise in the study of generalized airforces in unsteady supersonic cascades having subsonic axial velocity. The finite cascade of oscillating wedges involving thickness is first solved numerically. There is some indication that thickness effects are reduced by cascading. Next, the finite cascade of oscillating flat plates is solved analytically, to the third power of oscillation frequency. For comparison with the finite cascade, there is presented finally an elementary periodic solution for the infinite cascade. A simple relationship between the two basic cascade models is developed.

AD-A016 607/4GA PC$6.25/MF$2.25
Johns Hopkins Univ Baltimore Md Geophysical Fluid Dynamics Lab
Turbulent Entrainment at the Density Interface of a Two-Layer Stably Stratified Fluid System.
Interim rept.,
Lakshmi H. Kantha. Aug 75, 168p Rept no. GFD-Lab-TR-75-1
Contract N00014-75-C-0700, Grant NSF-DES72-01549

Descriptors: *Fluid flow, *Turbulence, Stratification, Density, Interfaces, Entrainment, Geophysics, Ocean currents, Atmospheric motion, Lakes, Reservoirs, Heat transfer, Momentum transfer, Mixing, Laboratory tests, Stability.
Identifiers: Two layer fluids, Richardson number, Stratified flow.

The report deals with entrainment at the density interface of a stable two-layer stratified fluid, resulting from the application and maintenance of a constant shear stress at the top of the upper layer. The investigation is the continuation of turbulence experiments reported earlier by Kato and Phillips (1969). The results seem to resolve the existing controversy on which Richardson number law the entrainment should follow.

AD-A016 616/5GA PC$5.25/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
An Experimental Investigation of Artificially Induced Transition to Turbulence on a Body of Revolution.
Master's thesis,
William F. Shivitz. 19 Jun 75, 120p Rept no. TM-75-178
Contract N00017-73-C-1418

Descriptors: *Boundary layer transition, *Turbulence, *Bodies of revolution, Blunt bodies, Instability, Trip wires, Pressure gradients, Afterbodies, Hot wire, Velocity, Sensitivity, Diameters, Position(Location), Free stream, Amplitude, Experimental data.

Transition to turbulence in a boundary layer continues to be a topic of considerable interest to both aerodynamicists and hydrodynamicists. The present study focuses on the particular aspect of the problem pertaining to transition zone characteristics induced by a circular trip wire located upstream of the point of instability on a blunt nosed body of revolution. The actual transition to turbulence occurs in a region of adverse pressure gradient. The study was made on an eight-inch diameter body of revolution which had a blunt nose faired to a cylindrical afterbody with a modified ellipsoid contour. The velocity field was measured with hot-wire sensors and analyzed using analog techniques to determine velocity, intermittency, spatial correlation, and spectral characteristics. Transition to turbulence was found to be very sensitive to trip wire diameter and location and to the free-stream Reynolds number. Certain of the high amplitude instability waves induced by the trip mechanism were observed to be selectively amplified into transition in a manner similar to that predicted by stability theory. Secondary instabilities were observed to contribute to the transition process. Cross spectral densities were measured for the bursts moving downstream to determine if any narrowband range of frequencies were present which could contribute to far-field noise radiated from the boundary layer. A one-third octave filter was used to determine spectral velocity fluctuation concentrations of the bursts at a location within the transition region and compared to similar concentrations at a fully turbulent location. (Author)

AD-A016 623/1GA PC$3.25/MF$2.25
Scientific Research Associates Inc Rockville Md
The Oscillation of Short Immersed Fluid-Filled Hoses.
Technical rept.,
Albert A. Hudimac. 9 Oct 75, 23p Rept no. 75-2
Contract N00014-70-C-0378

Descriptors: *Hydrodynamics, *Towed arrays, *Boundary value problems, Mechanical waves, Vibration, Hydrostatic pressure, Oscillation, Modular construction, Low pass filters, Vibration isolators, Damping, Fourier transformation, Mechanical cables, Iterations.
Identifiers: Mechanical filters.

Longitudinal oscillations in a towed array can be reduced by introducing an alternation of masses and short fluid-filled hoses. The pressure fields inside and outside of the hose are obtained by solving a boundary value problem with mixed boundary condition. An equivalent T section representation of the hose is given which can be used in calculating the filtering action of the iterated structure. (Author)

AD-A016 686/8GA PC$3.25/MF$2.25
Wisconsin Univ Madison Dept of Computer Sciences
High Reynolds Number Flow Between Rotating Coaxial Disks; A Numerical Experiment.
Technical rept.,
John H. Cerutti. 8 Apr 75, 16p Rept no. TR-249
Contracts N00014-67-A-0128-0004, DA-31-124-ARO(D)-462

Descriptors: *Fluid flow, *Reynolds number, *Nonlinear differential equations, Viscous flow, Incompressible flow, Navier Stokes equations, Computer applications, Rotation, Disks.
Identifiers: Ordinary differential equations, Collocation methods.

A pair of nonlinear ordinary differential equations that arise in the study of fluid flow between rotating coaxial disks is studied numerically. Collocation at Gaussian points is used to find approximate solutions to these equations for different values of the ratio of the angular velocity of one disk to the other. Recently J. B. McLeod and S. V. Parter have proved rigorous analytic results for the case when the disks rotate with equal and opposite angular velocity. A comparison between their analytic results and the numerical results is presented for this case.

AD-A016 728/8GA PC$3.75/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Wind Tunnel Tests of a New Diffuser Concept.
Interim technical rept. Sep 74-May 75,
James S. Petty. Jun 75, 33p Rept no. ARL-75-0198

Descriptors: *Wind tunnel nozzles, *Supersonic diffusers, *Gas dynamic lasers, Structural members, Flow visualization, Variable area nozzles, Wedges, Flow separation, Shock waves, Holography, Performance tests, Test methods.

Tests were conducted in the ARL 3 in. by 3 in. Mach 3 wind tunnel facility of a new variable geometry diffuser concept. This gas wedge diffuser incorporates controlled large flow separation regions as compression surfaces in place of solid surfaces. Test results indicate stable flow in the device and expected pressure recovery considerably in excess of normal shock recovery.

AD-A016 783/3GA PC$4.25/MF$2.25
Avco Systems Div Wilmington Mass
Exploratory Development of Hypersonic Heat Transfer and Thermomechanical Ablation of Advanced Materials: Review of European Progress.
Final rept. Apr 72-Mar 75,
Torstein K. Fannelop. Apr 75, 57p AFML-TR-75-25-Vol-2
Contract F33615-72-C-1803

Descriptors: *Turbulent boundary layer, *Heat transfer, *Boundary layer transition, *Hypersonic characteristics, Wind tunnel tests, Walls, Surface roughness, Experimental data, Assessment, Mathematical models, Viscous flow, Mixing, Mathematical prediction, Curvature, Flow separation, Sweden, Attachment, Ablation, Reentry vehicles.
Identifiers: Eddy viscosity, Mixing length, Flow reattachment.

The overall program study was in three specific areas: (1) evaluation of wind tunnel test data, (2) rough wall boundary layer transition, and (3) review of European turbulent boundary layer state of the art. The first two topics are included in Volume I and the last topic comprises Volume II. The study presented in Volume II is a result of a subcontract with the Aeronautical Research Institute of Sweden to review current European progress in turbulent boundary layer prediction methods. In particular, work related to nosetip boundary layer phenomenology, including the effects of roughness, body curvature, separation, and reattachment are discussed.

AD-A016 813/8GA PC$4.25/MF$2.25
North Carolina State Univ Raleigh Dept of Mechanical and Aerospace Engineering
Extraction of Stability Derivative Values from Test Data Taken on Undersea Vehicles - A Computerized Method.
Informal rept.,
Frederick O. Smetana, and W. Donald Johnson. Jun 75, 51p NCSL-251-75
Contract N61331-73-C-0049

Descriptors: *Underwater vehicles, *Hydrodynamics, Computerized simulation, Differential equations, Stability, Dynamic tests, Computer programs, FORTRAN, Equations of motion, Convergence.
Identifiers: Newton Rhapson technique.

The modified Newton-Rhapson technique is capable of identifying the stability derivatives (hydrodynamic coefficients) of a vehicle from dynamic flight test data. The technique computes a maximum likelihood estimate of the stability derivatives. This report documents an application of the modified Newton-Rhapson technique to undersea vehicles. To ensure convergence in a small number of iterations, a specialized starting technique is used to develop the initial value estimates of the stability derivatives. For a typical undersea vehicle, examples are provided which illustrate the results of varying the initial starting value and the effects of iteration number on the fit error. A user's guide for the FORTRAN computer program and background information for applying the technique to undersea vehicles are included, together with a general discussion of instrumentation considerations, test and measurement techniques, and piloting techniques for manned vehicles. (Author)

AD-A016 842/7GA PC$4.75/MF$2.25
Purdue Univ Lafayette Ind Project Squid Headquarters
Project Squid.
Semi-annual progress rept. 1 Apr-30 Sep 75,
T. Adamson, J. Broadwell, E. Browand, E. Bruce, and F. Carta. Oct 75, 95p
Contract N00014-67-A-0226-0005
See also AD-A010 225.

Descriptors: *Aerodynamics, *Combustion, *Turbulence, Scientific research, Turbulent flow, Reaction kinetics, Measurement, Mixing, Turbulent boundary layer, Energy transfer, Velocity, Blades, Jets, Flammability.
Identifiers: *Squid project.

Reports of progress during the past six months on the 18 research programs comprising Project Squid are presented. The research programs fall into the areas of Aerodynamics and Turbo Machinery, Combustion and Chemical Kinetics, Measurements and Turbulence. Project SQUID is a cooperative program of basic research related to jet propulsion. It is administered by Purdue University and sponsored by the Office of Naval Research.

AD-A016 896/3GA PC$3.75/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
The Role of the Zone of Dependence Concept in Three-Dimensional Boundary-Layer Calculations.
Final rept.,
Clarence W. Kitchens, Jr., Raymond Sedney, and Nathan Gerber. Aug 75, 38p Rept no. BRL-1821

Descriptors: *Aerodynamic characteristics, *Boundary layer flow, Angle of attack, Spinning(Motion), Three dimensional flow, Problem solving, Numerical methods and procedures, Mathematical models, Finite difference theory, Equations of motion.
Identifiers: Zone of dependence.

The subject is studied for the general initial-value problem which arises in several applications; e.g., a spinning body at incidence. An exact solution which simulates the essential features of the boundary layer on such a body is used as a test case. The zone of dependence concept places a restriction on the local mesh aspect ratio that may be used. Results from four finite-difference schemes are compared against the exact solution for various wall speeds and mesh aspect ratios. Error growth occurs when the zone of dependence rule is not satisfied. The sensitivity and manner of error growth for the four schemes are different; two of them are relatively insensitive. From stability analyses it is shown that the concepts of stability and zone of dependence are not the same. Our numerical experiments partly contradict the stability analyses.

AD-A016 903/7GA PC$3.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
The Singular Nature of Three-Dimensional Perturbations of Boundary Layers and the Small Cross Flow Theory,
Raymond Sedney. Aug 75, 18p Rept no. BRL-1820

Descriptors: *Boundary layer flow, Three dimensional flow, Two dimensional flow, Perturbations, Boundary value problems, Numerical analysis.

Three-dimensional perturbations on two-dimensional boundary layer flows are considered. First initially induced perturbations are studied and a general solution obtained. Second a specific externally induced perturbation is discussed. In both the streamwise velocity perturbation becomes infinite but the cross flow decays as downstream infinity is approached. This implies that the small cross flow approximation is a singular perturbation. The basis for this lies in the fact that the nature of the equations is changed by the approximation, viz., the zone of dependence property is lost.

NTIS/PS-75/814/4GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Boundary Layer Separation. Volume 1. 1966-1970 (A Bibliography with Abstracts).
Rept. for 1966-70,
Gerald H. Adams. Nov 75, 137p*
See also NTIS/PS-75/815.

Descriptors: *Bibliographies, *Fluid dynamics, *Boundary layer separation, Subsonic characteristics, Transonic characteristics, Supersonic characteristics, Hypersonic characteristics, Computer programming, Incompressible flow,

Theories, Mathematical models, Wind tunnel models, Field tests, Aerodynamic configurations, Geometric forms, Angle of incidence, Aerodynamics, Laminar boundary layer, Turbulent boundary layer.
Identifiers: Angle of attack.

The bibliography presents a wide range of data on the separation dynamics of laminar and turbulent boundary layers. Volume one, containing earlier research, is arranged like the following volume into four subunits. The first deals with general flow separation aspects, properties of incompressible flow, and subsonic characteristics. Section two covers transonic observations; section three is devoted to the supersonic regime; and section four contains studies at hypersonic velocities. Reference is made to theoretical studies, mathematical models and analyses, and computer applications. Wind tunnel laboratory, field, and free flight investigations are described. Tests are discussed for a number of geometric forms over several ranges of Reynolds numbers and for various conditions, angles of attack up to 20 degrees, and angles of incidence to 90 deg. Applications are to aerospace craft, helicopters, airplanes, airfoils, and various other configurations in the fields of fluid mechanics and aerodynamics. (Contains 127 abstracts)

NTIS/PS-75/815/1GA

PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Boundary Layer Separation. Volume 2. 1971-1975 (A Bibliography with Abstracts).
Rept. for 1971-75,
Gerald H. Adams. Nov 75, 124p*
See also NTIS/PS-75-814.

Descriptors: *Bibliographies, *Boundary layer separation, *Fluid dynamics, Subsonic characteristics, Transonic characteristics, Supersonic characteristics, Hypersonic characteristics, Incompressible flow, Laminar boundary layer, Turbulent boundary layer, Aerodynamics, Computer programming, Theories, Mathematical models, Wind tunnel models, Field tests, Aerodynamic configurations, Geometric forms, Angle of incidence.
Identifiers: Angle of attack.

Volume two of a two part bibliography on the flow separation properties of laminar and turbulent boundary layers uses the same format as volume one. Section one deals with general, incompressible, and subsonic characteristics; section two covers transonic research; section three is devoted to characteristics at supersonic speeds, and section four contains materials in the hypersonic regime. Applications covered are also the same. Aerospace craft, helicopters, airplanes, airfoils, and other configurations in fluid mechanics and aerodynamics. Tests and experiments are described. Investigations are discussed at various conditions over several ranges of Reynolds numbers, for angles of attack up to 20 degrees, and at angles of incidence to 90 deg. Theory, mathematical models, analytical methods, and computer applications are included. (Contains 115 abstracts)

NTIS/PS-75/819/3GA

PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Shear Flow. Part 1. Liquids (A Bibliography with Abstracts).
Rept. for 1964-Aug 75,
Gerald H. Adams. Nov 75, 157p*
See also NTIS/PS-75/820.

Descriptors: *Bibliographies, *Shear flow, *Liquid flow, Water flow, Lubricants, Polymers, Liquefied gases, Liquid metals, Measurement, Hydrodynamics, Magnetohydrodynamics, Fluidics, Rheology, Cavitation, Hydraulic fluids, Blood flow, Pipe flow, Drops(Liquids), Mathematical models, Computer programming.
Identifiers: Elastohydrodynamics, Fluerics.

Shear flow and stresses are studied for a number of liquid forms such as water, lubricants, polymers, liquefied gases, and liquid metals. The studies relate to hydrodynamics, elastohydrodynamics, magnetohydrodynamics, fluerics, rheology, acoustics, and oceanology. Some of the subjects include cavitation, jets, mixing, stratification, ultrasonics, capillary flow, blood circulation, sedimentation, wake, injection, liquid-gas interactions, and pipe and channel flow. Other topics cover drops, surface flow, nonnewtonian fluids, liquid crystals, hydraulic fluids, and layers. Theoretical aspects, mathematical models, equations of motion, computer programs, measurement technology, and empirical relationships are included. Excluded are materials on the atmosphere and wind shear, as well as drag reduction by polymers which is documented in a separate bibliography. (Contains 152 abstracts) See also NTIS/PS-75/497, Drag Reducing Fluids.

NTIS/PS-75/820/1GA

PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Shear Flow. Part 2. Gases. Volume 1. 1964-1969 (A Bibliography with Abstracts).
Rept. for 1964-Dec 69,
Gerald H. Adams. Nov 75, 159p*
See also NTIS/PS-75/821.

Descriptors: *Bibliographies, *Shear flow, *Gas dynamics, Boundary layer flow, Shock waves, Turbulence, Mixing, Subsonic characteristics, Transonic characteristics, Supersonic characteristics, Hypersonic characteristics, Jet flow, Model tests, Mathematical models, Geometric forms, Aerodynamic configurations.

A two volume bibliography cites reports on shear flow in gases including air, exhausts, lasers, and plasmas. Excluded are materials on wind shear. In Volume one characteristics are discussed involving boundary layer dynamics; shock waves; turbulent flow and mixing; stratification; wake; wind tunnel testing; subsonic, transonic, supersonic, and hypersonic flow; geometric configurations; magnus force; turbine blades, airfoils, and airframes; and magnetohydrodynamics. Some reference is made to flow separation and reattachment, the subjects also of other bibliographies. Model tests, jets, channel flow, and additional topics are discussed. Companion bibliographies present information on the general aspects of shear stress and flow, and on shear flow in liquids. (Contains 154 abstracts)

NTIS/PS-75/821/9GA

PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Shear Flow. Part 2. Gases. Volume 2, 1970-1975 (A Bibliography with Abstracts).
Rept. for 1970-75,
Gerald H. Adams. Nov 75, 171p*
See also NTIS/PS-75/822.

Descriptors: *Bibliographies, *Shear flow, *Gas dynamics, Boundary layer flow, Shock waves, Turbulence, Mixing, Subsonic characteristics, Transonic characteristics, Supersonic characteristics, Hypersonic characteristics, Geometric forms, Aerodynamic configurations, Model tests, Jet flow, Mathematical models.

In Volume two of a two volume bibliography, reports are continued on shear flow in gases including air, exhausts, lasers, and plasmas. Excluded are materials on wind shear. Characteristics are discussed involving boundary layer dynamics; shock waves; turbulent flow and mixing; stratification; wake; wind tunnel testing; subsonic, transonic, supersonic, and hypersonic flow; geometric configurations; magnus force; turbine blades, airfoils, and airframes; and magnetohydrodynamics. Some reference is made to flow separation and reattachment, the subjects also of other bibliographies. Model tests, jets, channel flow, and additional topics are discussed. Companion bibliographies present information on the general aspects of shear stress and flow, and on shear flow in liquids. (Contains 166 abstracts)

NTIS/PS-75/822/7GA

PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Shear Flow. Part 3. General Studies (A Bibliography with Abstracts).
Rept. for 1965-75,
Gerald H. Adams. Nov 75, 155p*

Descriptors: *Bibliographies, *Shear flow, *Fluid dynamics, Boundary layer flow, Layers, Stresses, Magnetohydrodynamics, Mixing, Viscous flow, Oscillations, Mathematical models, Computerized simulation, Equations of motion, Wake, Walls, Heat transfer, Wind tunnel models, Measurement.

General aspects of fluid shear in laminar and turbulent flow are discussed. Companion bibliographies contain materials on shear flows in specific gases and liquids. The present discussions cover boundary layer dynamics, layers, stratified flow, stresses, ducts, pipes, channels, mixing, bursts, magnetohydrodynamics, viscosity, and oscillation. References are made to separation and reattachment. Wind tunnel modeling and flat plate characteristics are described. Included also are mathematical models, computerized simulation, theory, equations of motion, anemometry, numerical analysis, and stability. Data are given on wall flow, wake, heat transfer, pressure gradients, and similar topics. Wind shear has been excluded. (Contains 150 abstracts)

NTIS/PS-75/823/5GA

PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Flow Reattachment (A Bibliography with Abstracts).
Rept. for 1964-Aug 75,
Gerald H. Adams. Nov 75, 91p*

Descriptors: *Bibliographies, *Fluid dynamics, *Surface properties, Separation, Boundary layer flow, Joining, Aerodynamic configurations, Geometric forms, Hypersonic characteristics, Subsonic characteristics, Transonic characteristics, Supersonic characteristics, Hydrofoils, Model tests, Test facilities, Heat transfer, Mathematical models, Airfoils, Jet flow, Flow visualization, Aircraft, Computer programming.
Identifiers: *Flow reattachment.

Studies are reported on certain fluid flow conditions where, after boundary layer or flow separation has occurred, the flow attaches again to a surface. The materials cover both laminar and turbulent boundary layers in gases and liquids, principally the former. Aerodynamic and gas flow research relates to subsonic, transonic, supersonic, and hypersonic speeds involving plane, curved, and cavity surfaces for various types of flow. Applications are to such forms as geometric shapes, ramps, wings, airfoils, and other bodies. Wind tunnel testing is described. Hydrodynamic and liquid flow data refer to jets and fluidic devices. Mathematical models and analyses are included. (Contains 86 abstracts)

NTIS/PS-75/824/3GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Boundary Layer Control (A Bibliography with Abstracts).
Rept. for 1969-Aug 75,
Gerald H. Adams. Nov 75, 148p*

Descriptors: *Bibliographies, *Boundary layer control, Subsonic characteristics, Supersonic characteristics, Turbomachinery, Wings, Airfoils, Model tests, Test facilities, Walls, Aircraft, Blowing, Boundary layer separation, Flaps(Control surfaces), Flow distribution, Spoilers, Mathematical models, Jets, Computer programming, Vortices.
Identifiers: Suction, Flow fields.

Cited is research on the control of boundary layers in various fluid mechanics domains. The applications are to aircraft, aerospace craft, ground effect craft, turbomachinery, and liquid flow. Airfoils, wings, flaps, fins, propellers, rotors, spoilers, nozzles, diffusers, intakes, inlets, jets, and blades are discussed. Gas speeds are subsonic, transonic, supersonic, and hypersonic. Investigations are reported on nozzle gas flow, base drag, high Reynolds number flow, and corner flow. Observations are made of vortex generators, circulation control, flutter suppression, suction, blowing bleed systems, cryogenic pumping, drag, and stall prediction and inhibition. Analysis includes computerized simulation, finite differ-methods, mathematical models, and numerical solutions. Additional topics are frost effects, buffeting, unsteady flow and heat and mass transfer. (Contains 143 abstracts)

N75-31009/4GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Calculation of the Flow of a Viscous Compressible Fluid around an Obstacle of Parabolic Shape.
R. Peyret, and H. Viviand. Sep 75, 12p NASA-TT-F-16558
Contract NASW-2790
Tran-Transl. Into English from Proceedings of 3D Intern. Conf. On Numerical Methods in Fluid Mech. (Paris), V. 2, 3-7 Jul. 1972 p 222-229.

Descriptors: *Compressible fluids, *Numerical analysis, *Parabolic bodies, *Viscous flow, Navier-stokes equation, Steady flow, Supersonic flow, Thermodynamic properties.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31015/1GA PC$3.25/MF$2.25
Politecnico di Torino (Italy). Ist. di Macchine e Motori per Aeromobili.
Vortical and Nonvortical Axisymmetric Flows in Ducts Flusso Assialsimmetrico Con O Senza Vortice in Ugelli.
M. Pandolfi. Jul 74, 17p PUBL-163
Language in Italian.

Descriptors: *Axisymmetric flow, *Ducts, *Vortices, Asymptotic methods, Boundary value problems, Elastic waves, Finite difference theory, Hyperbolic differential equations, Time dependence, Univac 1108 computer, Wall flow.

For abstract, see STAR 1322

N75-31016/9GA PC$3.25/MF$2.25
Politecnico di Torino (Italy). Ist. di Macchine e Motori per Aeromobili.
Numerical Analyses of Swirling Flows in Ducts Analisi Numerica di Flussi Vorticosi in Ugelli.
G. Bussi. Jul 74, 23p PUBL-166
In Italian; English Summary.

Descriptors: *Convergent-divergent nozzles, *Ducted flow, *Subsonic flow, *Swirling, *Vorticity, Boundary value problems, Graphs (Charts), Relaxation method (Mathematics), Turbulent wakes.

For abstract, see STAR 1322

N75-31381/7GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Annapolis, Md.
Influence of a Compliant Surface on the Characteristics of Turbulent Flow.
A. P. Teslo, and V. Y. Filipchuk. Sep 75, 10p NASA-TT-F-16555
Contract NASW-2990
Tran-Transl. Into English from Gidromekhanika (Ussr), No. 29, 1974 p 45-50.

Descriptors: *Flow characteristics, *Modulus of elasticity, *Turbulent flow, Aerodynamic coefficients, Aerodynamic drag, Hot-wire anemometers, Polyethylenes, Water flow.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31382/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Interaction Between a Shock Wave and a Vortex.
M. Merle, J. P. Fragassi, N. Nahhas, and B. Carbone. Sep 75, 6p NASA-TT-F-16575
Contract NASW-2790
Tran-Transl. Into English from Paper Jugoslovensko Drustvo Za Mehaniku (Ohrid), 1974. Conf-Presented at the 12TH Yugoslav Congr. Of Rational and Applied Mech., Ohrid, Yugoslavia, 3-8 Jun. 1974.

Descriptors: *Shock waves, *Vortices, *Wave interaction, Differential equations, Schlieren photography, Shock tubes, Sound waves.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31383/3GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Analysis of a Numerical Pressure Measurement System.
T. Dragovic. Sep 75, 15p NASA-TT-F-16560, COMMUN-2
Contract NASW-2790
Tran-Transl. Into English from Paper from the 1ST Yugoslav Aerocosmonautics Conf. (Belgrade), 19-20 May 1973 p 47-57.

Descriptors: *Flow characteristics, *Pitot tubes, *Pressure measurements, Hypersonic wind tunnels, Numerical analysis, Pressure distribution, Pressure sensors.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31384/1GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Determination of the Formation Pressure of Bubbles in Liquids.
G. Minelli. Sep 75, 15p NASA-TT-F-16570
Contract NASW-2790
Tran-Transl. Into English from Tec. Ital. (Trieste), V. 32, Nov. 1967 p 763-768.

Descriptors: *Bubbles, *Partial pressure, *Pressure measurements, Liquids, Numerical analysis, Pressure gages.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31394/0GA PC$4.25/MF$2.25
Oxford Univ. (England). Dept. of Engineering Science.
Steady and Unsteady Flow in a Semi-Cylindrical Hollow.
Interim Report.
T. A. Snuggs, and J. K. Aggarwal. 1975, 59p OUEL-1118/75
Subm-Sponsored by Sci. Res. Council.

Descriptors: *Cavities, *Flow visualization, *Steady flow, *Unsteady flow, Cavitation flow, Finite difference theory, Flow distribution, Flow measurement, Hydraulic test tunnels, Shear stress, Time dependence, Velocity distribution, Wall pressure.

For abstract, see STAR 1322

N75-31396/5GA PC$3.75/MF$2.25
National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
Improved Nozzle Testing Techniques in Transonic Flow. Influence of Jet Parameters. Part 1: Nozzle Thrust and Discharge Coefficients.
C. C. Groothoff. Feb 75, 43p NLR-MP-75008-U
Subm-Submitted for Publication.

Descriptors: *Discharge coefficient, *Nozzle thrust coefficients, *Transonic flow, Chokes (Fuel systems), Exhaust nozzles, Jet exhaust, Mass flow, Performance tests, Pipes (Tubes), Static pressure.

For abstract, see STAR 1322

N75-31397/3GA PC$5.25/MF$2.25
European Space Research Organization, Paris (France).
On the Stability of Free Convection Flow Along a Heated Vertical Plate.
K. Menzel. Mar 75, 120p ESRO-TT-149, DLR-FB-73-92
Tran-Transl. Into English of "Ueber das Stabilitaetsverhalten der Freien Konvektionsstroemung an Einer Beheizten Vertikalen Platte", Dfvlr, Freiburg I. B. Report Dlr-FB-73-92, 27 Jul. 1973. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 33.10 Dm.

Descriptors: *Blasius flow, *Flat plates, *Flow stability, *Free convection, Apexes, Perturbation, Taylor instability, Tollmein-schlichting waves.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31398/1GA PC$7.50/MF$2.25
European Space Research Organization, Paris (France).
Investigations of Axisymmetric Hypersonic Free Jets in High Total Enthalpy Wind Tunnels.
D. G. Papanikas. Mar 75, 235p ESRO-TT-150, DRL-FB-74-52
Tran-Transl. Into English of "Untersuch. Von Axialsymmetrischen Hyperschall-Freistrahlen in Windkanalmessstrecken Hoher Gesamtenthalpie," Dfvlr, Porz, West Ger. Report Dlr-FB-74-52, 17 Jul. 1974. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 80.90 Dm.

Descriptors: *Axisymmetric flow, *Free jets, *Hypersonic flow, *Plasma jet wind tunnels, Arc heating, Enthalpy, Far fields, Flow equations, Near fields.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31822/0GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

Higher Order Accurate Partial Implicitization: An Unconditionally Stable Fourth-Order-Accurate Explicit Numerical Technique.
R. A. Graves, Jr.. Sep 75, 28p NASA-TN-D-8021, L-10261

Descriptors: *Burger equation, *Difference equations, Fluid dynamics.

For abstract, see STAR 1322

N75-31857/6GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Visual Study of the Effect of Grazing Flow on the Oscillatory Flow in a Resonator Orifice.
K. J. Baumeister, and E. J. Rice. Sep 75, 28p NASA-TM-X-3288, E-8339

Descriptors: *Flow visualization, *Orifices, *Oscillating flow, *Resonators, Dyes, Flow distribution, High speed cameras, Orifice flow, Photographs, Water.

For abstract, see STAR 1322

PB-245 215/9GA PC$5.75/MF$2.25
California Univ., Berkeley. Dept. of Mechanical Engineering.
Laser Velocimeter Study of Entrance Flows in Curved Pipes,
Yogesh Chandra Agrawal. Jan 75, 134p FM-75-1
Grant NSF-ENG73-03970-A01

Descriptors: *Pipe flow, *Liquid flow, *Laminar flow, Boundary layer flow, Blood flow, Curvature, Tests, Measurement, Speed indicators, Lasers, Boundary layer separation, Velocity.
Identifiers: Entry flow, Curved pipes, Laser velocimeters, Velocity profiles.

Experimental investigation of the development of flow of steady, laminar, incompressible, Newtonian fluids in curved pipes is reported. The entry condition investigated is one of uniform irrotational motion. Two semi-circular pipes of radius ratios 1/2 and 1/7 were employed covering a Dean's number range from 139 to 565. Streamwise velocity and the component of secondary velocity in the plane of the pipe were measured using a Laser Doppler Velocimeter developed for the purpose. It is observed that the entry region is divided in two parts.

PB-246 127/5GA PC$4.75/MF$2.25
Swedish State Shipbuilding Experimental Tank, Goteborg.
Theoretical Investigation on the Dynamics of Cavitation Bubble Growth,
Bror Persson. 1974, 96p SSPA-Pub-72
Prepared in cooperation with Chalmers Univ. of Technology, Goteborg (Sweden).

Descriptors: *Cavitation, *Bubbles, *Fluid dynamics, Growth, Viscous flow, Heat transfer, Mass transfer, Mathematical models, Sweden, Theses.

A theoretical study of the influence of inertia, viscosity and heat and mass transfer on the onset of growth and on the growth history of cavitation bubbles is presented. The analysis indicates that the effect of the gas content on the threshold pressure is considerable. The influence of the viscosity and the heat transfer on bubble growth can be substantial in certain cases and depends primarily on the magnitude of the driving force and the initial ambient pressure. The effect of the radial convection on the bubble growth governed by mass diffusion is found to be of importance in highly supersaturated solutions.

20E. Masers and Lasers

AD-A016 426/9GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Auger Analysis of Three Enhanced Multilayer Dielectric Mirror Designs.
Physical sciences research papers,
William S. Ewing. 13 Jun 75, 16p Rept nos. AFCRL-PSRP-637, AFCRL-TR-75-0332

Descriptors: *Mirrors, *Dielectrics, *Auger electron spectroscopy, *Lasers, Interfaces, Layers, Zinc selenides, Thorium compounds, Fluorides, Contaminants, Oxygen, Sulfur, Chemical composition.
Identifiers: Thorium fluorides.

Three multilayer dielectric enhanced laser mirror designs have been analyzed using Auger Spectroscopy. Particular care was taken to characterize all layers and interfaces for contamination and composition. The designs characterized were found to be ZnSe/ThF4 multilayers of four and five pair stacks. Principal contaminants were identified as oxygen and for the case of ZnSe layers, sulfur. (Author)

AD-A016 437/6GA PC$5.25/MF$2.25
Martin Marietta Aerospace Orlando Fla
Laser Reliability Prediction.
Final technical rept. 27 Dec 73-28 Feb 75,
T. R. Gagnier, E. W. Kimball, and R. R. Selleck. Aug 75, 116p Rept no. OR-13667 RADC-TR-75-210
Contract F30602-74-C-0091

Descriptors: *Lasers, *Reliability, Statistical analysis, Performance(Engineering), Failure, Life cycles, Argon lasers, Carbon dioxide lasers, Dye lasers, Helium cadmium lasers, Helium, Neon, Semiconductor lasers, Gallium arsenide lasers, Injection lasers, TEA lasers, Solid state lasers, Manufacturing, Tables(Data), Bibliographies, Military requirements, Gas lasers.
Identifiers: Design.

This report presents the results of a program to locate, collect, and analyze laser reliability data, to construct laser reliability models, and to prepare revision sheets suitable for inclusion as a revision of Section 2.4, Lasers, in Mil-HDBK-217B. The report describes the methodology, analyses, models, failure rates, factors, and ground rules involved in the effort. It summarizes 10 million item-hours and 4 billion item-pulses of operating data collected from a sample of 1321 lasers, 2206 laser diodes, and 1750 laser subassemblies. Lasers discussed in detail include argon ion, flowing CO2, sealed CO2, dye, helium/cadmium, helium/neon, heterojunction, gallium arsenide injection, solid state, and transversely excited atmospheric pressure lasers. Major laser subassemblies, parts, and components are also included. In addition, the discussion covers failure modes and mechanisms; design criteria and notes; manufacturing criteria, problems, and burn-in; quantitative math models; failure rates; and life characteristics. A detailed bibliography and a list of data sources and contributors are included.

AD-A016 499/6GA PC$3.75/MF$2.25
Hughes Aircraft Co Culver City Calif Laser Div
Multiple Pulse Laser.
Final rept. Apr 72-Jul 74,
R. H. Dishington, B. C. Gilbert, and S. G. Palmer. May 74, 48p AFAL-TR-74-140
Contract F33615-72-C-1521

Descriptors: *Lasers, *Infrared lasers, *YAG lasers, *Q switching, Laser modulators, Optical pumping, Light pulses, Frequency multipliers, Electrooptics, Lithium compounds, Niobates, Neodymium, Doping.
Identifiers: Q switched lasers, Optical modulators, Lithium niobates, Yttrium aluminum garnet.

The objective of this program was to develop the techniques necessary to implement a multiple pulse laser. The particular multiple pulse device chosen for the effort was a 1.06 micrometer, Nd:YAG, electro optically modulated laser that could generate bursts of 1 millijoule, Q-switched pulses at average rates up to 10 bursts per second. The pulses in each burst were to be 1 microsecond apart and a burst was to last for 100 microseconds. As a further goal, it was required that the bursts would be generated upon command using an external trigger, and the first pulse of each burst should be transmitted not later than 3 to 5 microseconds after receiving the external trigger pulse. The baseline, guide system chosen is the TVR (Time Variable Reflection) cavity. Although TVR lasers had been built previously, the stringent requirements of the multiple pulse format demanded the solution of three major technical problems: Controlled pumping, high speed modulator driving, and modulator crystal acoustic damping.

AD-A016 605/8GA PC$3.25/MF$2.25
Avco Everett Research Lab Inc Everett Mass
Carbon Monoxide Laser.
Semi-annual technical rept.,
M. J. W. Boness, and R. E. Center. Sep 75, 22p
Contract N00014-72-C-0030, ARPA Order-1807
See also report dated Jan 75, AD-A003 584.

Descriptors: *Carbon monoxide lasers, *Laser cavities, *Heat exchangers, Fabrication, Gas flow, Performance tests, Interferometry, Electron beams, Gain, Diffraction, Electric discharges.
Identifiers: Pulsed lasers, Design, Electric discharge lasers.

The main objective of this program is the investigation of the pulsed electrical CO laser to determine the relative scaling parameters and the usefulness of high power CO lasers in systems applications. During this six month period the laser cavity and heat exchanger have been fabricated and assembled. Initial interferometric measurements indicated considerable turbulence in the flow which was greatly improved by introducing a fine stainless steel screen above the heat exchanger. However the original tests performed at a flow velocity of 50 cm/sec did not yield the desired medium uniformity and near-diffraction limited medium quality was eventually obtained by increasing the flow velocity to approximately 400 cm/sec. Currently the electrodes are being installed and the E-beam interfaced with the discharge cavity. Once completed further flow tests will be performed using the dump tank facility and the effect of the electrode structures upon the medium uniformity investigated. Finally gain and power measurements will be performed.

AD-A016 610/8GA PC$3.25/MF$2.25
Joint Inst for Lab Astrophysics Boulder Colo
Research in Laser Processes.
Final rept. 1 Jul 74-30 Jun 75,
A. V. Phelps. 28 Aug 75, 22p
Contract N00014-67-A-0405-0008, ARPA Order-2683

Descriptors: *Gas lasers, *Threshold effects, Propagation, Electric discharges, Carbon monoxide, Electron transport, Forward scattering, Backscattering, Resonance radiation, Gas ionization, Excitation, Carbon monoxide lasers, Carbon dioxide lasers.
Identifiers: Energy absorption, Ionization coefficients.

Calculations have been initiated to determine the threshold conditions and speed for propagation of the previously modeled con-

stricted (arc-like) discharges which often terminate high power, electrical discharge lasers. A 'complete' set of electron collision cross sections for CO has been assembled and tested against the meager electron transport data. Measurements of the Tl-Xe fluorescence in the vicinity of the 377.6 and 535 nm lines have been used to calculate the expected gain and absorption of this promising excimer laser candidate. Measurements of integrated absorption, forward scattering and backward scattering of radiation near the resonance lines have been made over a wide range of sodium densities and quenching rate coefficients.

AD-A016 611/8GA PC$3.25/MF$2.25
Mathematical Sciences Northwest Inc Bellevue Wash
Efficient High-Energy HCl Chemical Laser.
Semi-annual rept. 15 Jul 74-15 Jan 75,
Leonard Y. Nelson, and Stanley R. Byron. 15 Apr 75, 19p Rept no. MSNW-75-131-1
Contract N00014-75-C-0052, ARPA Order-1807

Descriptors: *Chemical lasers, *Excitation, *Electron beams, Hydrogen chloride, Hydrogen, Chemical reactions, Reaction kinetics, Coherent radiation, Test methods, Performance tests, Electron transitions.
Identifiers: *Hydrogen chloride lasers.

Vibrational excitation of H2 by an electron beam stabilized discharge is being investigated as a means of improving the performance of the HCl chemical laser. Recent calculations have shown that a nearly thousand fold increase in the rate limiting Cl + H2 chain reaction step can be achieved by exciting H2. Preliminary experiments indicate substantial laser output enhancement via a stabilized discharge excitation. Diagnostics for measuring HCl(v), H2(v) and Cl2 are being assembled.

AD-A016 619/9GA PC$3.75/MF$2.25
Washington Univ Seattle Dept of Electrical Engineering
Analysis of Coupling Efficiency Between Semiconductor Lasers and Rectangular Dielectric Waveguides.
Quarterly progress rept. for period ending 3 Dec 74,
Robert B. Smith, and Gordon L. Mitchell. 30 Jan 75, 30p
Contract N00123-73-C-1200

Descriptors: *Semiconductor lasers, *Waveguides, *Coupling circuits, Injection lasers, Efficiency, Shape, Digital computers, Dielectrics, Computer programs, Heterojunctions, Semiconductor junctions.
Identifiers: *Optical coupling, *Integrated optics, CDC 6400 computers.

The objective of this task was coupling from (rectangular) semiconductor laser sources to a rectangular optical waveguide. As a first step, a numerical calculation of coupling efficiency was programmed for the CDC-6400 computer at the University of Washington. This report summarizes the operation and results of the program. For examples run to date, this analysis indicates that neglecting Fresnel reflection coefficient losses at the fiber and coupling efficiencies that exceed 95% can be obtained in virtually all cases. (Author)

AD-A016 633/0GA PC$3.75/MF$2.25
Washington Univ Seattle Dept of Electrical Engineering
Fabrication of Linear Waveguides and Horn Shaped Coupling Structures.
Final rept. 15 Jul 73-14 Jul 74,
Robert B. Smith, David G. Dalgoutte , and J. H. Harris. 1 Dec 75, 35p
Contract N00123-73-C-1200

Descriptors: *Waveguides, *Fiber optics, *Injection lasers, *Coupling circuits, *Fiber optics transmission lines, Structures, Transitions, Propagation, Dielectrics, Fabrication, Optics, Shape.
Identifiers: *Integrated optics, *Optical coupling.

Coupling light from fibers to film for example integrated optic structures requires coupling over some finite length for materials which do not cleave easily. Some form of distributed coupler familiar to microwave circuitry is required. In this sense distributed means coupling over some finite aperture in the direction of propagation typically hundreds or thousands of wavelengths. This report describes a method of generating efficient couplers which do not require precise control of physical parameters and hence relax the tolerances for coupler construction. This crossed-beta coupler requires phase match between the two waveguides at only one point. Typically, this coupler may be realized by two waveguides whose respective propagation constants (beta) change linearly for a short region and cross at the phase match point. Analytical solutions for coupler efficiency and physical dimension are given. (Author)

AD-A016 667/8GA PC$3.75/MF$2.25
United Technologies Research Center East Hartford Conn
Optically Pumped Laser.
Annual technical rept. 15 Aug 74-15 Aug 75,
Robert T. Brown. 15 Oct 75, 47p Rept no. R75-921853-7
Contract N00014-74-C-0376, ARPA Order-1807
See also report dated 10 Oct 74, AD-787 497.

Descriptors: *Optical pumping, *Gas lasers, *Gas discharges, *Ultraviolet lasers, Helium, Nitrogen, Electric discharges, Visible spectra, TEA lasers, Gas ionization, Reaction kinetics.
Identifiers: *Electric discharge lasers, Helium nitrogen lasers, Visible lasers.

This report describes experimental and theoretical studies of a new technique for pumping high-pressure electric-discharge lasers. Using a new Corporate-owned pumping laser, several significant results were achieved. A clear demonstration of lasing on the 3371 A second positive transition in an optically-pumped electric discharge in a helium/nitrogen mixture was obtained. The peak uv signal was increased by three orders of magnitude over that obtained previously with the small TEA laser. Secondly, diffuse, high-electron-density, large-volume discharges were obtained in a geometry suitable for the incorporation of an optical cavity.

AD-A016 691/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Impulsive Loading of Targets by HF Laser Pulses.
Journal article,
Stephen Marcus, and Elbert J. Lowder. 6 Dec 74, 3p Rept no. JA-4435 ESD-TR-75-229
Contract F19628-73-C-0002, ARPA Order-600
Availability: Pub. in Jnl. of Applied Physics, v46 n5 p2293-2294 May 75.

Descriptors: *Pulsed lasers, *Chemical lasers, *Impulse loading, Hydrogen fluoride, Short pulses, Aluminum, Targets, Measurement, Pressure, Reprints.

Measurements of impulse coupling coefficients for 180-nsec HF (2.7 micrometers) laser pulses on aluminum targets are reported. The targets were irradiated both at atmospheric and reduced pressure. Coupling coefficients of up to 13 dyn sec/J were observed. These short-pulse 2.7-micrometers measurements are compared with 1.06-micrometers short-pulse measurements reported in the literature. (Author)

AD-A016 694/2GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
The Gain Profile and Time-Delay Effects in External-Cavity-Controlled GaAs Lasers.
Journal article,
Jon A. Rossi, Jaw J. Hsieh, and Helmut Heckscher. 10 Jan 75, 9p Rept no. MS-3889 ESD-TR-75-265
Contract F19628-73-C-0002
Availability: Pub. in IEEE Jnl. of Quantum Electronics, vQE-11 n7 p528-545 Jul 75.

Descriptors: *Laser cavities, *Gallium arsenide lasers, Gain, Time, Control systems, Profiles, Absorption, Semiconductor diodes, Q switching, Reprints.
Identifiers: Time delay.

An external dispersive cavity is used to map out the gain profile of single-heterostructure (SH), double-heterostructure (DH), and large-optical-cavity (LOC) lasers. The variations in gain profile with dopant and device operating conditions are reported. With certain cavity arrangements, long time delays in DH devices are observed; this shows that saturable absorption can be present in these as well as in all other types of GaAs diodes. A model combining saturable absorption with a breakdown in optical guiding makes it possible to consistently interpret all reported time-delay data for GaAs diffused-junction (DJ) and SH diode lasers, including Q-switching and abnormal-delay effects. Finally, experiments where two gratings are used to oscillate a diode simultaneously at two different, independently variable frequencies are described. (Author)

AD-A016 699/1GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Integrated GaAs-AlGaAs Double-Heterostructure Lasers.
Journal article,
Charles E. Hurwitz, Jon A. Rossi, Jaw J. Hsieh, and Charles M. Wolfe. 7 Apr 75, 4p Rept no. JA-4503 ESD-TR-75-271
Contract F19628-73-C-0002, ARPA Order-2006
Availability: Pub. in Applied Physics Letters, v27 n4 p241-243, 15 Aug 75.

Descriptors: *Gallium arsenide lasers, Optical waveguides, Room temperature, Fiber optics, Fabrication, Aluminum compounds, Currents, Integrated systems, Reprints.

Integrated structures consisting of a double-heterostructure GaAs-AlGaAs etched-mesa Fabry-Perot laser coupled to a high-purity GaAs waveguide have been fabricated and tested. Room-temperature threshold current densities as low as 7.5 kA/sq.cm for 1-micrometers-thick active layers were measured. (Author)

AD-A016 708/0GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Low-Threshold cw LiNdP4O12 Laser.
Journal article,
Stephen R. Chinn, and Henry Y-P. Hong. 6 Jan 75, 4p Rept no. JA-4473 ESD-TR-75-232
Contract F19628-73-C-0002
Availability: Pub. in Applied Physics Letters, v26 n11 p649-651, 1 Jun 75.

Descriptors: *Continuous wave lasers, Efficiency, Lithium compounds, Neodymium compounds, Phosphorus compounds, Oxides, Crystal structure, Room temperature, Reprints.

We have studied cw room-temperature lasing behavior of LiNdP4O12. A threshold of 360-micro watts optical excitation power at 0.582-micrometers wavelength was measured, with 18% power conversion efficiency to 1.048-micrometers radiation at 1-milliwatts output. The crystal structure is found to be monoclinic

(C2/c) rather than orthorhombic as previously reported. (Author)

AD-A016 799/9GA PC$4.25/MF$2.25
Texas Instruments Inc Dallas Central Research Labs
Monolithic Laser.
Annual technical rept. 1 May 74-30 Apr 75,
F. A. Blum, D. W. Bellavance, J. C. Campbell, F. H. Doerbeck, and K. L. Lawley. Jul 75, 53p Rept no. TI-08-75-27
Contract N00014-73-C-0288

Descriptors: *Injection lasers, *Monolithic structures(Electronics), Gallium arsenides, Indium, Waveguides, Chalcogens, Glass, Optical pumping, Transmitters.
Identifiers: Integrated optics, Indium arsenides.

This report describes the accomplishments of the second phase of the research program carried out under Contract No. N00014-73-C-0288 to develop the first prototype integrated optical transmitter. Extending the work of phase one on optically pumped mesa lasers, we have developed Ga(1-x)In(x)As (0 < or = x < or = 0.06) diode mesa lasers. These homojunction devices are the first wavelength-tunable, monolithic electrical injection lasers and have been operated between liquid nitrogen and room temperatures. Monolithic arrays of up to six mesa lasers have been operated with all the lasers oscillating simultaneously. Laser characteristics, including emission spectra, power output, and threshold current densities, have been measured in detail. Since these devices are homojunctions, their threshold current densities at room temperature are very high and their efficiencies are low. To improve on these characteristics, we have begun development of single-heterostructure GaAs-Ga(1-x)Al(x)As mesa lasers. These devices will operate under pulsed drive currents with low threshold current densities at room temperature. Their development and integration with planar waveguides continues under phase three of the current contract. Finally, chemical etching of the mesa structures has been explored as a possible alternative to growing the mesas. Preliminary encouraging results are given. (Author)

AD-921 655/7GA PC$7.50/MF$2.25
United Aircraft Research Labs., East Hartford, Conn.
Demonstration of HF Chain Reaction Laser.
Final rept.,
Edward C. Kepler, Thomas J. Sadowski, Richard Roback, and Richard A. Meinzer. Jul 74, 227p RK-CR-75-4
Contract DAAH01-73-C-0321
Distribution limitation now removed.

Descriptors: *Chemical lasers, *Gas dynamic lasers, *Infrared lasers, *Molecular spectroscopy, Hydrogen fluoride, High power, Continuous waves, Diatomic molecules, Laser cavities, Mirrors, Infrared radiation, Vibrational spectra, Electron transitions, Pressure, Gain, Supersonic nozzles, Diffusers, Molecular energy levels, Population, Distribution, Feasibility studies, Deuterium compounds, Emission spectra, Hydrogen, Fluorine, Reaction kinetics, Computer programs, Digital computers, Intermediate infrared radiation.
Identifiers: Hydrogen fluoride lasers, Chain reaction lasers, Specific power, Vibration states, Deuterium fluoride lasers, Excited states, Continuous wave lasers.

A theoretical and experimental investigation was conducted to evaluate the performance potential of the HF/DF chain reaction laser. The program consisted of: theoretical calculations to aid in the selection of design and laser operating conditions, laser power and gain tests of an 8 in. nozzle array, and chemiluminescent emission tests of a one in. nozzle segment. The experiments were conducted with a mass heater to preheat the primary flow to temperatures sufficient to dissociate only a small fraction of the fluorine molecules to F-atoms, which initiate the chain reaction, and preclude lasing solely under 'cold' reaction conditions.

NTIS/PS-75/792/2GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Gallium Arsenide Lasers (A Bibliography with Abstracts).
Rept. for 1964-Oct 75,
Mona F. Smith. Oct 75, 97p*
Supersedes NTIS/PS-74/044.

Descriptors: *Bibliographies, *Gallium arsenide lasers, Abstracts, Crystal growth, Crystals, Performance, Semiconductor lasers, Band theory of solids, Tuning, Optical pumping, Optical equipment, Infrared lasers, Emission spectra.
Identifiers: Tunable lasers.

The bibliography contains reports on the design, development, and applications of Gallium Arsenide lasers. Studies on band theory, optical modulators, emission spectra, optical pumping, tuning, and efficiency of these lasers are included.

PATENT-3 906 393
Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, Calif.
Acoustically Controlled Distributed Feedback Laser.
Patent.
C. Elachi. Patented 16 Sep 75, 8p PAT-APPL-374 423
Misc-Filed 28 Jun. 1973 Supersedes N73-27431 (11 - 18, p 2157). Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of patent available from Commissioner of Patents, Washington, D.C. 20231 $.50.

Descriptors: *Frequency control, *Laser modes, *Laser outputs, *Lasers, Coherent radiation, Equipment specifications, *Patents.
Identifiers: PAT-CL-331-94-5.

A distributed feedback laser that is capable of being continuously tuned and/or scanned is disclosed. The laser is capable of being operated in a continuous wave mode as well as a pulsed mode. A lasing medium and an acoustic transducer are mounted on a substrate to have acoustic waves produce periodic mechanical distortions of the lasing medium to cause corresponding periodic disturbances of the index of refraction of said lasing material. Conventional means of excitation of the lasing medium such as by electron bombardment, laser illumination, and application of electrical current, may be used.

PATENT-3 906 397
Not available NTIS
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Diatomic Infrared Gasdynamic Laser.
Patent.
R. L. Mckenzie. Patented 16 Sep 75, 9p PAT-APPL-137 391
Misc-Filed 26 Apr. 1971 Supersedes N72-10432 (10 - 01, p 0063).
Government-owned invention available for licensing. Copy of patent available from Commissioner of Patents, Washington, D.C. 20231 $.50.

Descriptors: *Diatomic gases, *Electron transitions, *Gasdynamic lasers, *Infrared spectra, *Molecular rotation, *Wavelengths, Gas mixtures, Optical pumping, Optical resonance, *Patents, Vibrational spectra.
Identifiers: PAT-CL-331-94-5.

A gasdynamic laser which utilizes the infrared vibration-rotation transitions of a diatomic gas such, as carbon monoxide, is reported.

20F. Optics

AD-A016 300/6GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Mining Metallurgical and Ceramic Engineering
Fabrication of Special Waveguide Shapes and Mechanical Properties of Glass Fiber Waveguides.
Final rept. on Task 4, 27 Nov 73-31 Dec 74,
William D. Scott, G. Achutatamayya, Roger L. K. Matsumoto, and Gordon L. Mitchell. 28 Feb 75, 20p
Contract N00123-73-C-1200

Descriptors: *Glass fibers, *Fiber optics, *Optical waveguides, Semiconductor lasers, Waveguide couplers, Silica glass, Drawing(Forming), Fabrication, Dielectric waveguides, Tensile strength, Thin films, Polyethylene plastics, Plastic coatings, Optical communications.
Identifiers: Integrated optics, Borosilicate glass.

Special optical fibers with exposed waveguides have been constructed for coupling between fibers and (integrated optics) films. They are typically 1 x 35 micrometers rectangular on a low index supporting structure which has a 200 x 1200 micrometer cross section. These externally mounted fibers were produced by pulling microscope slides of various material in a two step process. Measured coupling efficiencies between spuddered waveguides and externally mounted fibers are 70%. Transition fibers whose core cross section tapers from a rectangular (1 x 20 micrometers) to circular (3 micrometers) in a millimeter or two length have been produced for butt joining semiconductor lasers to round waveguides. They have measured transition losses of less than 1 dB and negligible absorption/scattering loss.

AD-A016 301/4GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Mining Metallurgical and Ceramic Engineering
Mechanical Properties of Glass Fiber Waveguides and Fabrication of Special Waveguide Shapes.
Quarterly progress rept. 1 Jan-31 Mar 74 on Task 4,
Gordon L. Mitchell, William D. Scott, G. Achutaramayya, and Roger L. K. Matsumoto. 30 Apr 74, 13p
Contract N00123-73-C-1200
See also report dated 28 Feb 75m AD-A016 300.

Descriptors: *Glass fibers, *Fiber optics, *Drawing(Forming), *Optical waveguides, Silica glass, Heating, Furnaces, Temperature, Mechanical properties.
Identifiers: Integrated optics.

Fiber pulling results for silica fibers with both oxi-hydrogen torches and RF suceptor furnaces are reported. Conventional clad fibers and exposed or externally mounted glass fibers have been drawn with conventional kanthol furnances.

AD-A016 321/2GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
A Stochastic Gaussian Beam. II,
D. W. McLaughlin. 19 Aug 74, 5p Rept no. SI-17
Contract N00014-67-A-0467-0027
See also AD-759 299.
Availability: Pub. in Jnl. of Mathematical Physics, v16 n1 p100-103 Jan 75.

Descriptors: *Beams(Electromagnetic), *Focusing, Propagation, Variations, Stochastic processes, Deformation, Perturbation theory, Intensity, Reprints.
Identifiers: *Gaussian beams.

The propagation of a Gaussian beam in a strongly focusing medium is considered. The medium is subject to random deformations of the beam axis. The average intensity and the intensity fluctuations on the beam axis and the mean population remaining in the fundamental mode are computed when the random inhomogeneities are weak and the distance between the source and observation points is large. All results for random axis deformations are compared to those obtained earlier for random width perturbations. The mean intensity off the beam axis and the mean population transfer into higher modes are also discussed. (Author)

AD-A016 561/3GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Center for Materials Science and Engineering
Fast Infrared Optical Shutter,
A. V. Nurmikko, and G. W. Pratt, Jr. 8 Apr 75, 3p
Contract DAHC04-72-C-0051
Availability: Pub. in Applied Physics Letters, v27 n2 p83-84, 15 Jul 75.

Descriptors: *Shutters(Optics), *Semiconducting films, *Light modulators, *Infrared equipment, Radiation absorption, Far infrared radiation, Lead compounds, Tin compounds, Tellurides, Infrared pulses, Infrared lasers, Carbon dioxide lasers, Reprints.
Identifiers: *Infrared shutters, Lead tin tellurides, Optical switching, Absorption edges.

Rapid modulation of infrared radiation in the 10-micrometer wavelength region has been achieved by operating a thin-film Pb(1-x)Sm(x)Te optical shutter. The switching mechanism considered here takes advantage of the rapid absorption edge shift induced by an intense incident optical pump. Experimental evidence suggests the possibility of producing picosecond infrared transients. (Author)

AD-A016 664/5GA PC$8.50/MF$2.25
Xonics Inc Van Nuys Calif
Theoretical Studies of High-Power Ultraviolet and Infrared Materials.
Technical rept. no. 5, 6 Dec 74-30 Jun 75,
M. Sparks, and C. J. Duthler. 30 Jun 75, 253p
Contract DAHC15-73-C-0127, ARPA Order-1969
See also report dated 6 Dec 74, AD-A009 256.

Descriptors: *Ultraviolet optical materials, *Infrared optical materials, *Laser beams, *Dielectrics, *Radiation effects, Laser materials, Raman spectra, Absorption(Physical), Optical properties, Refractive index, Avalanche effect(Electronics), Plasmas(Physics), Ultraviolet lasers, Electric fields, Two photon absorption.
Identifiers: Multiphonon absorption, Dielectric breakdown.

Contents: Current status of electron-avalanche-breakdown theories; Preliminary theory of electron-avalanche breakdown in dielectrics by laser and dc fields; VUV window failure by multiphoton absorption and electron defocusing, avalanche, and absorption; Optical distortion from the nonlinear refractive index; Studies of optical properties of alkali halide crystals; A possible mechanism for extrinsic absorption in insulators below the fundamental absorption edge; Multiphonon absorption of alkali halides and quasiselection rules; Enhanced stimulated raman scattering and general three-boson parametric instabilities.

AD-A016 736/1GA PC$3.25/MF$2.25
Washington Univ St Louis Mo
Magnetic Domains for Integrated Optics.
Technical rept.,
M. W. Muller, M. J. Sun, and S. K. Chung. 1974, 22p
Contract N00014-67-A-0445-0005, Grant NSF-GH-32000
Availability: Pub. in Symposium on Opitcal and Acoustical Micro-Electronics, Polytechnic Institute of New York, p393-411, 16-18 Apr 74.

Descriptors: *Magnetic domains, *Optics, Thin films, Epitaxial growth, Integrated systems, Waveguides, Gratings(Spectra), Dielectrics, Polarization, Interactions, Reprints.
Identifiers: *Integrated optics, Magnetic films.

Stripe domain structures in uniaxial magnetic films are capable of being used as polarization-rotating gratings. The periodicity of such gratings can be controlled by externally applied magnetic fields. We describe field control of grating period in epitaxial magnetic garnet films. The phase-matching and polarization-rotating properties of domain gratings can be used to provide field-controlled interaction between asynchronous TE and TM modes in a thin-film dielectric waveguide. We find that with the material parameters available at present, mode conversion between guided modes is feasible, but coupling between guided and radiating modes is too weak to be practical. (Author)

AD-A016 772/6GA PC$4.25/MF$2.25
Ohio State Univ Columbus Electroscience Lab
Computer Simulation of Random Atmospherically Degraded Optical Beams.
Final technical rept. 24 Jan 74-14 Jan 75,
S. A. Collins, Jr., and D. D. Duncan. Sep 75, 67p
Rept no. ESL-3862-2 RADC-TR-75-222
Contract F30602-74-C-0130, DARPA Order-2646

Descriptors: *Light transmission, Atmospheric motion, Turbulence, Optical images, Image processing, Computerized simulation, Fourier transformation, Correlation techniques.
Identifiers: *Atmospheric attenuation, Atmospheric transmissivity.

This report develops a scheme for simulating randomly degraded optical beams including both phase and log-amplitude and the effect of their cross-correlation. The scheme works for optical degradations whose scale lengths range from much smaller to much larger than the input aperture size. An extension of the well-known Fourier transform method is used for the small scale fluctuations and a polynomial approach is used for the larger scale fluctuations.

AD-A016 846/8GA PC$11.25/MF$2.25
Harris Corp Melbourne Fla Electronic Systems Div
Optical Cable Communications Study.
Final rept. 26 Mar 74-25 Apr 75,
F. R. McDevitt, and I. B. Slayton. Jul 75, 426p
RADC-TR-75-187
Contract F30602-74-C-0193

Descriptors: *Fiber optics transmission lines, Cables, Optical communications, Optical waveguides, Glass fibers, Connectors, Light emitting diodes, Injection lasers, Semiconductor lasers, Gas lasers, YAG lasers, Waveguide couplers, Multiplexing, Circuits, Electrooptics, Bandwidth, Signal to noise ratio, Tactical communications, Acoustooptics, Mathematical analysis, Dielectric waveguides, Photodiodes, Optical detectors, Data transmission systems, Military requirements, Computer applications, Air Force.
Identifiers: Design, Optical modulators, Helium neon lasers.

This study Final Report provides a general treatment of the design methodology for applying fiber optics technology to Air Force communications applications. The study was involved with the classification of the Air Force communications requirements which are suitable for optics implementation as well as the assessment of the rationale for applying fiber optics communications channels in contrast to the application of conventional cable alternatives. In parallel with this task, this study also involves the development of the analytical expressions for predicting system performance in terms of the design parameters associated with each of the constituent elements of a fiber optics link. Major elements being considered as part of this parameter translation and design methodology task include the application of coherent and noncoherent optical sources, acousto-optic and electro-optic modulators, step index graded index fibers, and PIN/Avalanche detectors. Communication alternatives considered include party line multiterminal and point-to-point communications involving both analog and digital baseband modulation as well as subcarrier intensity modulation.

COM-75-50549/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Paraxial Ray Analysis of a Cat's-Eye Retroreflector.
Final rept.,
J. J. Snyder. Aug 75, 4p
Grant NSF-GP-39308
Pub. in Applied Optics, v14 n8 p1825-1828 Aug 75.

Descriptors: *Optical equipment, *Reflectors, Mirrors, Lenses.
Identifiers: Reprints, *Retroreflectors.

The cat's-eye retroreflector is a passive optical system consisting of a secondary mirror placed at the focal point of a primary lens. The authors analyze the cat's eye using the paraxial ray matrix approach. The position of the equivalent reflecting surface, and the angular field of view of a realizable cat's eye are functions of the radius of curvature of the secondary mirror. The field of view is maximum for a secondary mirror with a concave radius of curvature equal to the focal length of the primary lens. The authors further derive the general dependence of retroreflection errors on misadjustment of the secondary mirror.

COM-75-50637/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Partial Coherence in Imaging Systems.
Final rept.,
D. Nyyssonen. Aug 74, 6p
Pub. in Opt. Eng., v13 n4 p362-367 Jul/Aug 74.

Descriptors: *Densitometers, *Optical measurement, Coherence, Airy function.
Identifiers: Microdensitometers, Reprints.

An improved method of measuring spatial coherence is described and some sources of measurement errors is discussed. Partial coherence in the image plane of an optical system is discussed and results of coherence measurements are given that demonstrate the scaling of the coherence function for coherence intervals large compared to the diameter of the Airy disk and the limiting value for the coherence interval equal to the diameter of the Airy disk. The application of these results to microdensitometry is discussed and results of coherence measurements in the source plane of currently-used classical microdensitometers are given.

N75-31854/3GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

An Improved Technique for Determining Reflection from Semi-Infinite Atmospheres with Linearly Anisotropic Phase Functions.
C. L. Fricke. Sep 75, 41p NASA-TN-D-8011, L-10153

Descriptors: *Atmospheres, *Functions (Mathematics), *Radiative transfer, *Reflection, Chandrasekhar equation, Computer programs, Flow charts, Light beams, Light scattering.

For abstract, see STAR 1322

N75-31877/4GA PC$3.75/MF$2.25
Florida Univ., Gainesville. Engineering and Industrial Experiment Station.
Evaluation of Atomic Constants for Optical Radiation, Volume 1.
Final Report, Nov. 1970 - Feb. 1974.
C. D. Kylstra, and R. J. Schneider. Dec 74, 36p NASA-CR-143460
Contract NGL-10-005-049

Descriptors: *Atomic energy levels, *Light (Visible radiation), *Transition probabilities, Computer programs, Quantum numbers, Tables (Data).

For abstract, see STAR 1322

N75-31878/2GA PC$9.25/MF$2.25
Florida Univ., Gainesville. Engineering and Industrial Experiment Station.
Evaluation of Atomic Constants for Optical Radiation, Volume 2.
Final Report, Nov. 1970 - Feb. 1974.
C. D. Kylstra, and R. J. Schneider. Dec 74, 323p NASA-CR-143425
Contract NGL-10-005-049

Descriptors: *Atomic spectra, *Optical transition, Atomic energy levels, Dipoles, Electron transitions, Ionization coefficients, Quadrupoles.

For abstract, see STAR 1322

N75-31879/0GA PC$5.25/MF$2.25
Radio Corp. of America, Princeton, N.J. Astro-Electronics Div.
Solid State Electro-Optic Color Filter and Iris.
Final Report, Dec. 1974 - Jun. 1975.
Jun 75, 108p NASA-CR-144436, AED-R-4103
Contract NAS9-13549
Misc-Original Contains Color Illustrations.

Descriptors: *Color television, *Electro-optics, *Electromagnetic wave filters, *Irises (Mechanical apertures), *Solid state devices, Goggles, Polarizers, Stereotelevision.

For abstract, see STAR 1322

N75-31880/8GA PC$5.75/MF$2.25
Arizona Univ., Tucson. Optical Sciences Center.
User'S Manual for University of Arizona Apart Program (Analysis Program - Arizona Radiation Trace).
R. P. Breault. Aug 75, 137p NASA-CR-143938
Contract NAS8-27804

Descriptors: *Computer programs, *Light scattering, *Sky radiation, *Telescopes, Beams (Radiation), Optical measurement, Symmetry.

For abstract, see STAR 1322

20G. Particle Accelerators

AD-A016 563/9GA PC$5.75/MF$2.25
Visidyne Inc Burlington Mass
The Design and Flight Test of a 30 kw Rocket-Borne Electron Accelerator Module (EXCEDE II Test) HAES Report Number 22.
Final rept. 23 Dec 74-31 Jul 75,
O. Shepherd, J. W. Carpenter, W. P. Reidy, W. A. Sheehan, and T. F. Zehnpfennig. 15 Jul 75, 128p Rept no. VI-289 AFCRL-TR-75-0379
Contract F19628-75-C-0115
Report on the High Altitude Effects Simulation Program.

Descriptors: *Electron accelerators, *Upper atmosphere, Rocketborne Payload, Experimental design, Electron guns, Power supplies.
Identifiers: EXCEDE program.

A 30 kw, 3 kV rocket-borne electron accelerator was designed, fabricated, tested and launched from the Poker Flat Research Range as part of the EXCEDE Program. Additional rocket-borne and ground instrumentation provided diagnostic information to evaluate accelerator performance. The high voltage power supply and electron guns were designed specifically for high power deposition. This engineering test demonstrated the accelerator met its design criterion.

AD-A016 692/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Energy Dissipation in a Thin Polymer Film by Electron Beam Scattering: Experiment.
Journal article,
Richard J. Hawryluk, Henry I. Smith, and Antonio M. Soares. 30 Dec 74, 11p Rept no. JA-447? ESD-TR-75-231
Contract F19628-73-C-0002
Availability: Pub. in Jnl. of Applied Physics, v46 n6 p2528-2537 Jun 75.

Descriptors: *Thin films, *Electron beams, *Polymers, Scattering, Energy, Monte Carlo method, Substrates, Computerized simulation, Reprints, Profiles.
Identifiers: Energy dissipation.

A series of experiments of scanning electron beam exposure of PMMA films on silicon, copper, and gold substrates is described, and compared with the calculations of Monte Carlo and analytic models of energy dissipation per unit volume. Film thickness was varied from 1000 to 10000, accelerating voltage from 10 to 20 kV, and linear charge density from 10 to the minus 9th power to 0.00001 C/cm. Good agreement was obtained in the comparison with the predictions of Monte Carlo calculations, whereas some discrepancies were observed in the comparison with the analytic models. The assumption inherent in the theoretical approaches that PMMA acts like a linear recording medium, in the sense that exposure is additive, is experimentally evaluated by means of an Abel inversion. The assumption that developed profiles represent surfaces of equal energy dissipation was examined by means of a computer simulation of the development process. (Author)

20H. Particle Physics

AD-A016 315/4GA PC$3.25/MF$2.25
Queen'S Univ Belfast (Northern Ireland) Dept of Applied Mathematics and Theoretical Physics
Calculation of Ionic Recombination Coefficient in an Ambient Gas Taking Specific Account of Angular Momentum,
D. R. Bates, and I. Mendas. 17 Feb 75, 8p
Contract N00014-69-C-0035
Availability: Pub. in Jnl. of Physics B: Atomic and Molecular Physics, v8 p10 n1770-1775 1975.

Descriptors: *Atomic properties, *Recombination reactions, *Ions, *Quantum statistics, *Angular momentum, *Gases, Atomic structure, Thermodynamics, Equilibrium(General), Physics, Reprints.

Following the work of Bates and McKibbin (1974) the quasi-equilibrium statistical method is applied to ionic recombination in an ambient gas taking specific account of the angular momenta of the ion-ion pairs instead of assuming as usual, that the micro-canonical distribution is preserved. It is found that the elaboration leads to the calculated value of the recombination coefficient being reduced by only around 2%. (Author)

AD-A016 317/0GA PC$3.25/MF$2.25
Queen'S Univ Belfast (Northern Ireland) Dept of Applied Mathematics and Theoretical Physics
Low Energy Scattering of Electrons by Helium Atoms,
K. A. Berrington, P. G. Burke, and A. L. Sinfailam. 9 Jan 75, 17p
Contract N00014-69-C-0035
Availability: Pub. in Jnl. of Physics B: Atomic and Molecular Physics, v8 n9 p1459-1473 1975.

Descriptors: *Inelastic scattering, *Atomic properties, *Nuclear cross sections, Helium, Electrons, Nuclear scattering, Eigenvectors, Wave functions, Physics, Reprints.

No abstract available.

AD-A016 883/1GA PC$5.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
The Effects of the Evaluator Assigned Nitrogen Nuclear Cross Section Uncertainties Upon the Transport of Neutrons in Air.
Final rept.,
William B. Beverly, Andrus Niiler, and Norman E. Banks. Sep 75, 106p Rept no. BRL-1830

Descriptors: *Neutron transport theory, *Nuclear cross sections, *Nitrogen, Air, Uncertainty, Nuclear radiation, Sampling, Inelastic scattering, Elastic scattering, Sensitivity, Perturbations, Range(Distance), Monte Carlo method, Computer programs, Computations, Comparison.

The sensitivity of the transport of 14-MeV neutrons in sea level air to uncertainties in the ENDF/B-III values of the various Nitrogen cross sections has been calculated using the correlated sampling Monte Carlo neutron transport code SAMCEP. The source consisted of a 14.0 to 15.0-MeV band of isotropic neutrons and the fluences (0.5-15.0-MeV) were calculated at radii from 50 to 1500 meters. Various perturbations were assigned to the ENDF/B-III or base cross section set. They were: (1) a 5% increase to the elastic cross section with a corresponding decrease in the inelastic cross section, (2) a 3% decrease in the elastic cross section with an equivalent increase in the inelastic cross section, (3) the smoothing of the valley in the elastic cross section around 11 MeV with compensating changes taken in adjustments among the other partial cross sections, (4) a 10% increase in the elastic cross section with 2% of the compensating change being taken in the total cross section and the remainder absorbed in the inelastic cross section, (5) a 10% increase in the elastic cross section with the compensating change taken totally in the inelastic cross section, (6) an increase of 20% in the first Legendre coefficient and an increase of 10% in the second coefficient of the elastic scattering angular distribution and (7) a decrease of 10% in both the first and second Legendre coefficients of the elastic scattering. Transport calculations were carried out using various physically realistic sets of perturbed cross sections, bounded by evaluator-assigned uncertainties, as well as the base set.

COM-75-11466/0GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
Nuclear Science Education Day. Proceedings of a Conference Held at the National Bureau

of Standards, Gaithersburg, Md., November 29, 1973.
Final rept.,
Frederick J. Shorten. Nov 75, 98p NBS-TN-888
Sponsored in part by American Nuclear Society, Washington, D.C. Library of Congress Catalog Card no. 75-600081.

Descriptors: *Nuclear energy, *Meetings, Nuclear fission, Nuclear fusion, Environmental surveys, Radiation hazards, Personnel development, Nuclear electric power generation.

These proceedings are a collection of invited papers given at the Nuclear Science Education Day Conference held on November 29, 1973 at the National Bureau of Standards, Gaithersburg, MD. The program was sponsored jointly by the ANS (Washington Chapter) and the NBS for secondary school science teachers and outstanding science students in the Washington area. Four main topics are covered: Research and development in nuclear energy applications; man, environment and nuclear energy; nuclear science frontiers; and career opportunities in nuclear science.

COM-75-11469/4GA PC$12.00/MF$2.25
National Bureau of Standards, Washington, D.C. Center for Radiation Research.
Proceedings of the Conference on Nuclear Cross Sections and Technology Held in Washington, D.C. on March 3-7, 1975. Volume I.
Final special pub.,
R. A. Schrack, and C. D. Bowman. Oct 75, 488p* NBS-SP-425-Vol-1
Library of Congress Catalog Card no. 75-619216. See also Volume 2, COM-75-11470.
Paper copy also available in set of 2 reports as COM-75-11468-SET, PC$24.00.

Descriptors: *Nuclear cross sections, *Meetings, Nuclear fission, Nuclear fusion, Breeder reactors, Neutron flux.
Identifiers: Biomedicine.

These proceedings are the compilation of 217 papers presented at the Conference on Nuclear Cross Sections and Technology held in Washington, D.C. on March 3-7, 1975. The Conference summarized the present status of nuclear cross sections and technology and discussed future cross section needs. Special emphasis is placed on reactor technology and biomedial applications of nuclear science and the measurement of standard cross sections. Session headings contained in Volume 1 include the following: Fission reactors; Instruments and techniques; Microscopic data and techniques; Benchmarks and sensitivities; Management of the actinides; Cross sections and flux standards; Evaluation and calculation of cross sections of nonfissionable materials; Reactor physics transport and sensitivity.

COM-75-11470/2GA PC$13.00/MF$2.25
National Bureau of Standards, Washington, D.C. Center for Radiation Research.
Proceedings of the Conference on Nuclear Cross Sections and Technology Held in Washington, D.C. on March 3-7, 1975.
Final special pub.,
R. A. Schrack, and C. D. Bowman. Oct 75, 555p* NBS-SP-425-Vol-2
Library of Congress Catalog Card No. 75-619216. See also Volume 1, COM-75-11469.
Paper copy also available in set of 2 reports as COM-75-11468-SET, PC$24.00.

Descriptors: *Nuclear cross sections, *Meetings, Nuclear fission, Nuclear fusion, Breeder reactors, Neutron flux.
Identifiers: Biomedicine.

Contents:
Various applications of nuclear data;
Cross sections measurements on fissionable isotopes;
Fusion;
Neutron cross section measurements on nonfissionable materials;
Benchmarks and sensitivities;
Measurements of Neutron cross sections of nonfissionable materials;
Roundtable discussion of the significance and accomplishments of the conference.

COM-75-50537/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The L/K Electron Capture Ratio in First-Forbidden (81g)Kr Decay.
Final rept.,
W. M. Chew, A. C. Xenoulis, R. W. Fink, F. J. Schima, and W. B. Mann. 1974, 14p
Pub. in Nuclear Physics A, v299 p79-92 1974.

Descriptors: *Krypton isotopes, *Radioactive decay, *Electron capture, Metastable state.
Identifiers: Reprints, *Krypton 81.

The L/K electron capture (EC) ratio of 81gKr was measured to be 0.146 plus or minus 0.005 using the wall-less, anticoincidence, multiwire proportional counter technique and a reactor-produced, mass separated 81gKr source. From this value, the QEC and log ft values were determined to be 305 (+38, -29) keV and 11.6 respectively, assuming EC decay only to the ground state. If there is 6% EC branching to a reported 276 keV level, QEC becomes 327(+30,-14)keV from which (L/K)(g.s)=0.143 plus or minus 0.005, log ft = 11.6 for EC to the ground state, (L/K)(276)=0.197 plus or minus 0.005, and log ft = 11.4 for 6% feeding to the 276 keV level. In order to be confident of these results, an extensive systematic comparison of experimental and theoretical L/K ratios was made for both first forbidden nonunique and unique transitions. From this comparison, a 7/2+ ground state assignment for 81Kr is confirmed.

COM-75-50540/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Direct Test for Violation of CP Invariance.
Final rept.,
Russell C. Casella, and Baldwin Robertson. 1 Aug 73, 3p
Pub. in Physical Review D, v8 n3 p968-970, 1 Aug 73.

Descriptors: *Kaons, Radioactive decay, Quantum theory, Invariance.
Identifiers: Reprints, *Charge parity violation.

Two tests are proposed for directly establishing violation of CP invariance in neutral-kaon decay. Provided that there exist only two neutral kaons, these tests rely only on the principles of quantum theory and relativistic kinematics and, in particular, are independent of the Weisskopf-Wigner approximation made in the theory of Lee, Oehme, and Yang. One of these tests can be made using data that will soon be available and the other can be made with existing techniques.

COM-75-50571/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
3He (gamma,d) 1H Cross Section 10 to 21 MeV.
Final rept.,
C. C. Chang, W. R. Dodge, and J. J. Murphy, II. Apr 74, 9p
Pub. in Physical Review B, v9 n4 p1300-1308 Apr 74.

Descriptors: *Photonuclear reactions, *Differential cross sections, Helium 3, Photodisintegration.
Identifiers: Reprints.

A measurement of the 3He(e,d)1H 90 degree differential cross section between 10 and 21 MeV was made. The 3He(e,d)1H cross section was converted into a 3He(gamma,d)1H cross section. The shape of the 3He(gamma,d)1H cross section agrees with recent theoretical calculations. The authors find no evidence for the anomalies (structure) in the 3He(gamma,d)1H 90 degree differential cross section at excitation energies of 14.5 and 19.5 MeV reported in two recent experiments.

COM-75-50640/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Sum Rules for Forward Elastic Pion-Nucleon Scattering.
Final rept.,
L. C. Maximon, and J. S. O'Connell. 8 Jul 74, 4p
Pub. in Physics Letters B, v51 n1 p31-34, 8 Jul 74.

Descriptors: *Pions, *Nucleons, *Nuclear scattering, Dispersion relations.
Identifiers: Reprints.

A number of energy weighted sum rules relating amplitudes and differential cross sections for forward elastic and charge exchange scattering to the total pion-nucleon cross section are derived from dispersion relations.

20I. Plasma Physics

AD-A016 784/1GA PC$3.75/MF$2.25
California Univ Livermore Lawrence Livermore Lab
Experimental Investigation of Beam-Plasma Interactions with an Intense Relativistic Electron Beam,
R. E. Hester, and R. J. Briggs. 24 Feb 66, 48p
Rept no. UCID-15393
Supported by the Advanced Research Projects Agency, Arlington, Va.

Descriptors: *Plasmas(Physics), *Electron beams, Gas ionization, Interactions, Instability.
Identifiers: Plasma diagnostics, Plasma instabilities.

The experimental program uses the 4 MeV, 100 ampere, 0.3 microsec pulse width, beam from the Astron accelerator facility to study the interaction of an intense relativistic electron beam with a gas column, usually at a pressure of a few mm Hg. The beam promptly ionizes the gas, generating a plasma column in and around the beam. In this environment measurements were made pertinent to two beam driven instabilities, namely the streaming instability and the hose instability.

N75-31894/9GA PC$3.25/MF$2.25
Groupe de Recherches Ionospheriques, Issyles-Moulineaux (France).
Theory of Instantaneous Triple-Probe in a Low Density Continuum Plasma.
J. S. Chang. Aug 74, 23p GRI/NTP/132

Descriptors: *Collisionless plasmas, *Electron energy, *Low density research, *Plasma probes, Collision parameters, Cooling, Cylindrical bodies, Debye length, Geometry, Mean free path, Spheres, Symmetrical bodies.

For abstract, see STAR 1322

20J. Quantum Theory

AD-A016 322/0GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Four Examples of the Inverse Method as a Canonical Transformation,
D. W. McLaughlin. 8 Aug 74, 5p Rept no. SI-19
Contract N00014-67-A-0467-0027

Availability: Pub. in Jnl. of Mathematical Physics, v16 n1 p96-99 Jan 75.

Descriptors: *Wave equations, *Transformations, Hamiltonian, Schrodinger equation, Nonlinear systems, Reprints.
Identifiers: *Nonlinear wave equations, *Dispersive wave equations, Korteweg-de Vries equation, Toda lattice, Sine-Gordon equation, Canonical transformations, Inverse methods.

The Toda lattice, the nonlinear Schrodinger equation, the sine-Gordon equation, and the Korteweg-de Vries equation are four nonlinear equations of physical importance which have recently been solved by the inverse method. For these examples, this method of solution is interpreted as a canonical transformation from the initial Hamiltonian dynamics to an action-angle form. This canonical structure clarifies the independence of an infinite number of constants of the motion and indicates the special nature of the solution by the inverse method. (Author)

AD-A016 333/7GA PC$3.25/MF$2.25
IBM Research Lab San Jose Calif
A Hartree-Fock Interaction Potential Between a Rigid Asymmetric Top and a Spherical Atom: (H2CO, He).
Technical rept.,
William A. Lester, Jr., Barbara J. Garrison, and Henry F. Schaefer, III. 7 Apr 75, 8p Rept no. TR-8
Contract N00014-72-C-0244
Availability: Pub. in Jnl. of Chemical Physics, v63 n4 p1449-1454, 15 Aug 75.

Descriptors: *Formaldehyde, *Helium, *Hartree-fock approximation, Interactions, Potential energy, Surfaces, Reprints.

A basis set of better than 'triple zeta plus polarization' quality is used to compute the interaction potential between a rigid H2CO superscript 1 A sub 1 and He superscript 1 S. The highly anisotropic energy surface has a slight attraction arising from induction effects at intermolecular separations around 9 a.u. It is fitted to a spherical harmonic expansion to facilitate scattering applications. (Author)

AD-A016 506/8GA PC$3.25/MF$2.25
Pittsburgh Univ Pa Dept of Physics
Dissociation of CH4 and CD4 by Electron Impact: Production of Metastable and High-Rydberg Hydrogen and Carbon Fragments,
T. G. Finn, B. L. Carnahan, W. C. Wells, and E. C. Zipf. 6 Sep 74, 11p
Grants DA-31-124-ARO(D)-440, NGL-39-011-030
Errata sheet inserted.
Availability: Pub. in Jnl. of Chemical Physics, v63 n4 p1596-1604, 15 Aug 75.

Descriptors: *Methane, *Deuterium compounds, *Dissociation, Electron beams, *Metastable state, Atomic energy levels, Excitation, Differential cross sections, Reprints.

The production of hydrogen and carbon atoms in metastable and high-lying Rydberg states due to electron-impact disscoiation of CH4 and CD4 has been investigated for incident electron energies from threshold to 300 eV. Onset energies for the production of metastable hydrogen atoms were observed at electron impact energies of 22.0 + or - 0.5, 25.5 + or - 0.6, 36.7 + or - 0.6, and 66 + or - 3 eV, and at 26.6 + or - 0.6 eV for the production of metastable carbon atoms. Most of the excited H fragments appear to have been formed initially in high-lying Rydberg states with the metastable H(2S) state populated principally by cascade. The differential cross section for the dissociative excitation of H atoms to metastable and high-lying Rydberg states reached a maximum value of approximately 10 to the -19th power sq cm/sr at 100 eV. At the same energy, the metastable carbon differential cross section is 2 x 10 to the -20th power sq cm/sr. (Author)

AD-A016 513/4GA PC$3.25/MF$2.25
Rochester Univ N Y Dept of Physics and Astronomy
Foundations of a Quantum Probability Theory,
M. D. Srinivas. 17 Jan 75, 17p ARO-9407.32-P
Grant DAHC04-74-G-0014
Availability: Pub. in Jnl. of Mathematical Physics, v16 n8 p1672-1685 Aug 75.

Descriptors: *Quantum theory, *Probability, Stochastic processes, Markov processes, Quantum statistics, Transformations(Mathematics), Measure theory, Reprints.

Statistical physical theories are frequently formulated in terms of probabilistic structures founded on a 'logic of experimentally verifiable propositions'. It is argued that to each experimentally verifiable proposition there corresponds an experimental procedure which, in general, alters the state of the system, and is completely characterized by a 'measurement transformation' or 'operation.' An analysis of the relations among these experimental procedures lead us to a 'logic of operations' which is quite different from the 'lattice theoretic logics' that are often considered (albeit inadequate empirical justification), as models for the calculus of experimentally verifiable propositions of quantum theory. It is seen that the quantum probability theory based on the logic of operations provides the proper mathematical framework for discussing the statistics of successive observations in quantum theory. We also indicate how a theory of quantum stochastic processes can be formulated in a way similar to the Kolmogorov formulation of the classical theory.

AD-A016 516/7GA PC$3.25/MF$2.25
Oregon Univ Eugene Dept of Physics
Stripping-Mechanism Dependence of the Ar 2s Fluorescence Yield.
Mau Hsiung Chen, and Bernd Crasemann. 28 Apr 75, 3p ARO-12838.8-P
Grant DAHC04-75-G-0021
Availability: Pub. in Physical Review A, v12 n2 p710-711 Aug 75.

Descriptors: *Argon, *Fluorescence, Holes(Electron deficiencies), Auger electrons, X rays, Stripped atoms, Particle collisions, Ions, Atoms, Reprints.

Argon L sub 1 fluorescence yields have been calculated for the individual multiplet states of ions containing from three to six M-shell vacancies. Effective fluorescence yields for these charge states are computed for statistically distributed states and for distributions that would arise in sequential stripping. For Ar L sub 1 M superscript 6, the latter result is approx. 430 times smaller than the former. (Author)

AD-A016 709/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Unified Model of the Insulator-Metal Transition in Ti2O3 and the High-Temperature Transitions in V2O3.
Journal article,
Herbert J. Zeiger. 19 Dec 74, 14p Rept no. JA-4393 ESD-TR-75-227
Contract F19628-73-C-0002
Availability: Pub. in Physical Review B, v11 n12 p5132-5144, 15 Jun 75.

Descriptors: *Transition temperature, *Metals, *Insulation, *Band theory of solids, Electrons, Energy, High temperature, Bonding, Excitons, Nuclear spins, Reprints.
Identifiers: *Insulators, Insulator metal transition.

A unified band-crossing model of the insulator-metal transition in Ti2O3 and the high-temperature transition in V2O3 is presented. The model is based on a Hartree-Fock free-energy calculation including electron-electron Coulomb energy, elastic energy, and band-electron entropy, and taking into account the partial overlap of e(pi) bonding and antibonding bands. Below the transition temperature, the a sub 1 bonding band is taken to lie below the e(pi) bonding band in Ti2O3, and above the Fermi level in the e(pi) bonding band in V2O3. This difference in ordering in the model calculation is found to be determined largely by the difference in electron-electron Coulomb energy for Ti2O3 and V2O3, due to the difference in number of electrons per cation. The transitions in Ti2O3 and V2O3 are ascribed to the crossing of the a sub 1 bonding band and the e(pi) bonding band as a function of temperature, due mainly to competition between electron-electron energy and band-electron entropy. The model calculation is applied to a description of the behavior of lattice parameters, specific heat, and magnetic susceptibility through the transition temperature in Ti2O3 and V2O3. The effect of the substitution of impurities on the nature of the transitions is also discussed. The calculated properties of Ti2O3 are found to be at best only in qualitative agreement with experiment, and in the case of the magnetic susceptibility, in serious disagreement. It is suggested that the disagreement may be in part due to the formation of singlet excitons in Ti2O3. On the other hand, the model predictions are nearly quantitatively correct for many of the properties of V2O3.

AD-A016 745/2GA PC$3.25/MF$2.25
IBM Research Lab San Jose Calif
Hartree Fock and Gordon-Kim Interaction Potentials for Scattering of Closed-Shell Molecules by Atoms: (H2CO,He) and (H2,Li(+)).
Technical rept.,
Sheldon Green, Barbara J. Garrison, and William A. Lester, Jr. 10 Mar 75, 11p Rept no. TR-7
Contract N00014-72-C-0244
Availability: Pub. in Jnl. of Chemical Physics, v63 n3 p1154-1161, 1 Aug 75.

Descriptors: *Particle collisions, *Atoms, *Molecules, *Interactions, *Potential energy, Scattering cross sections, Models, Electron gas, Lithium, Hydrogen, Formaldehyde, Helium, Reprints.
Identifiers: Gordon-Kim interaction potentials, Hartree-Fock interaction potentials.

The Gordon-Kim (GK) electron gas model for calculating the forces between closed-shell atoms and molecules is applied to the He-H2CO and Ki(+)-H2 systems. GK interaction energies are computed following the original theory and also including the self-energy correction suggested by Rae. GK interaction energies neglecting correlation, are found to be in qualitative accord with Hartree-Fock (HF) interaction energies for the two systems. However, quantitative discrepancies are noted which are possible sources of error if GK potential energy surfaces are used to compute accurate scattering cross sections. (Author)

AD-A016 753/6GA PC$3.25/MF$2.25
Irt Corp San Diego Calif
Associative Ionization in Collisions between Two Excited Reactants.
Technical rept.,
R. H. Neynaber, and G. D. Magnuson. 19 May 75, 6p Rept no. INTEL-RT-8103-003
Contracts N00014-74-C-0011, F44620-74-C-0002
Availability: Pub. in Physical Review A, v12 n3 p891-894 Sep 75.

Descriptors: *Molecular beams, *Ionization, *Cross sections, *Helium, *Neon, Reaction kinetics, Collisions, Reprints.

Absolute and relative cross sections were obtained for the associative ionization (AI) reaction He* + Ne* yields HeNe + e by a merging-beams technique over a range of interaction energy W from 0.01 to 10 eV. The He* represents a composite of He(2 superscript 1 S) and He(2 Superscript 3 S), and the Ne* a composite of Ne(3S superscript 3 P2) and Ne(3S superscript 3 P sub 0) This study represents the first direct evidence of AI for which both reactants are excited. Studies were also made of the possible AI reaction Ne* + Ar* yields NeAr + e from thermal energy to 10 eV. (Author)

N75-31847/7GA PC$4.25/MF$2.25
College of William and Mary, Williamsburg, Va. Dept. of Physics.
Use of the Wigner Representation in Scattering Problems.
Final Report.
E. A. Bemler. Mar 75, 66p NASA-CR-132737
Contract NAS1-11808

Descriptors: *Quantum mechanics, *Scattering, *Stochastic processes, Propagation, Scattering cross sections.

For abstract, see STAR 1322

20K. Solid Mechanics

AD-A016 323/8GA PC$3.75/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
On the Validity of a Nonlinear Dynamic Stability Theory,
B. J. Matkowsky, and G. J. Habetler. 15 May 74, 26p Rept no. SI-31
Contract N00014-67-A-0467-0027, Grant NSF-GP-27368
Availability: Pub. in Archive for Rational Mechanics and Analysis, v57 n2 p166-188 1974.

Descriptors: *Boundary value problems, *Nonlinear systems, *Mechanics, Dynamics, Eigenvectors, Mathematical models, Solids, Solid state physics, Perturbation theory, Reprints.

No abstract available.

AD-A016 406/1GA PC$5.75/MF$2.25
Dayton Univ Ohio Research Inst
Development of Flight-by-Flight Fatigue Test Data from Statistical Distributions of Aircraft Stress Data. Volume I.
Final rept. Oct 72-Jan 75,
George J. Roth. May 75, 137p AFFDL-TR-75-16-Vol-1
Contract F33615-73-C-3007
See also Volume 2, AD-A016 407.

Descriptors: *Fatigue tests(Mechanics), *Airframes, *Stress analysis, Aluminum alloys, Strain(Mechanics), Loads(Forces), Fatigue(Mechanics), Data processing, Spectrum analysis, Statistical distributions, Fatigue life, Cyclic tests, Flight recorders, Strain gages, Stresses, Amplitude, Crack propagation, Aerodynamic loading, Gust loads, Jet bombers, Jet fighters, Data bases, Flight simulation, Control sequences, Damage assessment.
Identifiers: Aluminun alloy 7075-T651, B-58 aircraft, F-106 aircraft.

Axially loaded specimens of 7075-T651 aluminum with a hole were fatigue tested using loading histories derived from strain gage data recorded on operational aircraft. For the baseline data the magnitude and order in which the loads occurred during a flight were preserved. The flight contained data from taxi, takeoff, flight and landing strain histories. The data was processed by several counting techniques to obtain statistical distributions of the cyclic and mean stress amplitudes, as well as the number of stress cycles per flight for both the ground operations and the inflight operations. These distributions were then used to generate a series of flight-by-flight test sequences. Three different counting techniques were used to determine the statistical distribution of the cyclic stress for each of two aircraft types. The report presents the results in terms of the number of flights to failure for 9 sequences of B-58 data and 6 sequences for the F-106 data. A total of 91 specimens were tested. The report concludes that simulated testing sequences can yield the same fatigue life as the original strain gage data recorded on operational aircraft.

AD-A016 407/9GA MF$2.25
Dayton Univ Ohio Research Inst
Development of Flight-by-Flight Fatigue Test Data from Statistical Distributions of Aircraft Stress Data. Volume II. Documentation of the B-58 and F-106 Fatigue Spectra Simulation Programs.
Final rept. Oct 72-Jan 74,
Michael C. Hill, and Kathryn J. Dillhoff. May 75, 405p AFFDL-TR-75-16-Vol-2
Contract F33615-73-C-3007
See also Volume 1, AD-A016 406.
Availability: Microfiche copies only.

Descriptors: *Fatigue tests(Mechanics), *Airframes, *Stress analysis, *Computer programs, Loads(Forces), Fatigue(Mechanics), Aerodynamic loading, Spectrum analysis, Statistical distributions, Jet fighters, Jet bombers, Peak values, Computer program documentation, Hybrid computers, Statistical data, Flow charting, Flight simulation, Data processing, Subroutines, Time dependence, Tables(Data).
Identifiers: B-58 aircraft, F-106 aircraft, CDC 6600 computers.

This report documents the computer programs and subroutines written in support of the effort presented in Volume I. The report describes and documents two aircraft simulation programs used to process flight loads data derived from B-58 and F-106 aircraft flying operational missions. A simulation merge program is also included which combines the output tapes from the aircraft simulation programs and generates an output tape compatible with the hybrid computer. The program listings and sample problems for the simulation programs are presented in the Appendices.

AD-A016 510/0GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Wave Propagation in Nonuniform Elastic Rods,
Gerald Rosenfeld, and Joseph B. Keller. 29 Sep 74, 5p AFOSR-TR-75-1457
Grant AF-AFOSR-2013-71
Availability: Pub. in Jnl. of the Acoustical Society of America, v57 n5 p1094-1096 May 75.

Descriptors: *Wave propagation, Elastic waves, Elastic properties, Rods, Cross sections, Amplitude, Conservation, Energy, Asymptotic series, Reprints.

Asymptotic solutions are obtained for elastic waves propagating in any nonuniform rod, with an arbitrary cross section which varies slowly along the length of the rod. The solutions are valid when the variation in cross section along the rod is sufficiently slow. For each mode the result is of the WKB type, involving a phase function, an amplitude function, and a mode form. The phase velocity and the mode form at each cross section are obtained from the solution for the corresponding uniform rod. The amplitude function is obtained from an equation which is equivalent to conservation of energy. An application of the results is made to long waves. The linear theory of elasticity is used throughout. (Author)

AD-A016 628/0GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Mechanical Engineering
The Vibrations of an Infinite Orthotropic Layered Viscoelastic Shell in an Acoustic Medium,
Bruce S. Berger. Sep 75, 17p
Contract N00014-67-A-0239-0020

Descriptors: *Shells(Structural forms), *Viscoelasticity, *Acoustic waves, Dynamic response, Equations of motion, Numerical analysis, Finite difference theory, LaPlace transformation.
Identifiers: Orthotropism.

The solution of the vibration of an orthotropic layered cylindrical viscoelastic shell in an acoustic medium is derived through the application of the theorem of correspondence to the shell equations of motion. The acoustic fluid is modelled through a finite difference scheme. Numerical results for the normal displacements are in exact agreement with known elastic solutions. (Author)

AD-A016 880/7GA PC$3.25/MF$2.25
Naval Research Lab Washington D C
Photoelastic Analysis of Shrinkage Stresses and Its Application to the Micromechanics of Composites.
Final rept.,
Vincent J. Parks. 12 Sep 75, 21p Rept no. NRL-7921

Descriptors: *Stress analysis, *Photoelasticity, *Composite materials, *Shrinkage, Curing, Stresses, Two dimensional, Three dimensional, Rocket propellant grains, State of the art.
Identifiers: Rind effect.

A review of progress over the past 20 years in the development of photoelastic methods to determine the stresses and strains caused by restrained shrinkage in multimaterial bodies and in particular in composites demonstrates that the photoelastic method has been developed into a viable method for both two-dimensional and three-dimensional analysis of stresses caused by restrained shrinkage. The method has been used to solve a number of important problems and presumably will be used to solve more. Three-dimensional photoelasticity is generally applied to the microanalysis of shrinkage stresses in composite materials subjected to slow curing or slow thermal changes. Two-dimensional photoelastic analysis of composites is seen to be hampered by an inherent condition called pinching, which restricts the analysis to regions away from the interfaces of the composite material. (Author)

AD-A016 922/7GA PC$3.75/MF$2.25
Watervliet Arsenal N Y
Exterior Collocation for Three Dimensional Surface Flaws.
Technical rept.,
M. A. Hussian, R. F. Haggerty, S. L. Pu, and B. Noble. Sep 75, 38p Rept no. WVT-TR-75053

Descriptors: *Fracture(Mechanics), Defects(Materials), Surface properties, Stresses, Intensity, Cracks, Surfaces, Three dimensional, Numerical integration, Potential theory, Boundary value problems.
Identifiers: Collocation method, Harmonic functions.

In the paper the problem of a three dimensional surface flaw is solved by the method of exterior collocation. Representing the shape of such a

crack by a sector of a circle, the objective is to construct a set of harmonic functions such that the most stringent boundary conditions are satisfied exactly. These conditions are: the normal displacement is zero outside the crack surface and the normal stress is zero or prescribed inside the crack surface. There are additional boundary conditions due to the symmetry of the problem. Using integral forms of harmonic functions, the above conditions are satisfied and the rest of the boundary conditions exterior to the plane of the crack are then satisfied by collocation in the least square sense.

N75-31481/5GA PC$10.25/MF$2.25
Grumman Aerospace Corp., Bethpage, N.Y.
Modal Coupling Procedures Adapted to Nastran Analysis of the 1/8-Scale Shuttle Structural Dynamics Model. Volume 2: Supporting Data.
Final Report.
J. Zalesak. Jul 75, 392p NASA-CR-132667
Contract NAS1-10635

Descriptors: *Computer programs, *Coupled modes, *Dynamic structural analysis, *Space shuttle orbiters, Finite element method, Plots, Tables (Data).

For abstract, see STAR 1322

N75-31483/1GA PC$4.25/MF$2.25
MacNeal-Schwendler Corp., Los Angeles, Calif.
Nastran Modifications for Recovering Strains and Curvatures.
Final Report.
C. W. Hennrich. Mar 75, 59p NASA-CR-134794, EC-296-2
Contract NAS3-18899

Descriptors: *Computer programs, *Revisions, *Stress-strain diagrams, *Structural analysis, Curvature, Data processing.

For abstract, see STAR 1322

N75-31484/9GA PC$4.25/MF$2.25
Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Mechanical Engineering.
Isofinel: Isoparametric Finite Element Code for Elastic Analysis of Two-Dimensional Bodies.
Annual Status Report.
C. Marino. Sep 75, 67p NASA-CR-143498, SM-75-4
Contract NGR-39-087-053

Descriptors: *Computer programs, *Elastic properties, *Finite element method, *Structural analysis, *Two dimensional bodies, Graphs (Charts), Numerical integration, Stiffness matrix, Stress analysis, Stress-strain diagrams.

For abstract, see STAR 1322

N75-31485/6GA PC$15.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Nastran: User'S Experiences.
Sep 75, 621p NASA-TM-X-3278, L-10436
Conf-Colloq. Held at Hampton, VA., 9-11 Sep. 1975.

Descriptors: *Computer programs, *Conferences, *Finite element method, *Structural analysis, Computer techniques, Eigenvalues, Error correcting codes, Space shuttles, Wing panels.

For abstract, see STAR 1322

N75-31526/7GA PC$4.75/MF$2.25
Ohio State Univ., Columbus. Aero-Astro Engineering Dept.
Vibration of Skewed Cantilever Plates and Helicoidal Shells.
D. P. Beres, and C. D. Bailey. Sep 75, 79p NASA-CR-2588
Contract NGR-36-008-197

Descriptors: *Cantilever plates, *Shells (Structural forms), *Structural vibration, Hamiltonian functions, Numerical analysis, Skewness, Vibrational stress.

For abstract, see STAR 1322

N75-31527/5GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A Finite-Difference Program for Stresses in Anisotropic, Layered Plates in Bending.
N. J. Salamon. Sep 75, 85p NASA-TN-D-8059

Descriptors: *Bending, *Finite difference theory, *Laminates, *Stress analysis, Composite materials, Computer programming, Elastic deformation, Mathematical models, Plates (Structural members).

For abstract, see STAR 1322

N75-31532/5GA PC$3.75/MF$2.25
Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium). Section Construction Metallique.
Reinforcement Method of Openings in Cylindrical Pressure Vessels Subject to Internal Pressure.
J. Decock. Feb 75, 43p CRIF-MT-104
Subm-Sponsored by Inst. Pour l'Encour. De la Rech. Sci. Dans l'Ind. Et l'Agr.

Descriptors: *Cylindrical bodies, *Internal pressure, *Pressure vessels, *Reinforcement (Structures), Elastic properties, Standards, Stress concentration, Structural design.

For abstract, see STAR 1322

N75-31533/3GA PC$3.75/MF$2.25
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
A Computer Programme for Elastic-Plastic Calculations with Use of Trim 6 Finite Elements.
A. U. Dekoning, and A. Sanderse. 10 Dec 72, 40p NLR-TR-72144-U
Subm-Sponsored by Neth. Agency for Aerospace Programs.

Descriptors: *Computer programs, *Finite element method, *Plastic deformation, *Stress concentration, Linearization, Nonlinear equations, Plastic anisotropy, Stiffness matrix, Strain hardening.

For abstract, see STAR 1322

N75-31534/1GA PC$5.25/MF$2.25
European Space Research Organization, Paris (France).
General Differential Equations in Matrix Form for Thin Elastic Shells with a Solution for Twisted Tubes.
W. Woebbecke. Mar 75, 108p ESRO-TT-142, DLR-FB-73-118
Tran-Transl. Into English of "Allgemeine Differentialgleichungen Duenner Elastischer Schalen in Matrizendarstellung MIT Einer Loesung fuer Verwundene Roehren", Dfvlr, Brunswick Report Dlr-FB-73-118, Oct. 1973. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 23.50 Dm.

Descriptors: *Elastic shells, *Matrices (Mathematics), *Partial differential equations, *Pipes (Tubes), *Thin walled shells, Bending theory, Stress concentration, Twisting, Vector analysis.
Identifiers: Translations.

For abstract, see STAR 1322

20L. Solid-State Physics

AD-A016 520/9GA PC$3.25/MF$2.25
General Electric Corporate Research and Development Schenectady N Y
Electron Transport in Some One-Dimensional Metal Complex Semiconductors,
L. V. Interrante. 1975, 18p AFOSR-TR-75-1407
Contract F44620-71-C-0129
Availability: Pub. in Low-Dimensional Cooperative Phenomena, p299-314 1975.

Descriptors: *Semiconductors, *Electron transport, *Transition metals, *Metal complexes, Platinum compounds, Palladium compounds, Halides, Ammonia, Ethylenediamine, Electrical conductivity, Reprints.

The subject of one dimensional electronic interactions in transition metal complexes has been treated in several other papers in this volume, with particular emphasis on systems which exhibit 'metallic' properties. The main purpose of this paper is to develop the argument that transition metal complex semiconductors are also of significant scientific and technological interest and to encourage further work on such materials. (Author)

AD-A016 521/7GA PC$3.25/MF$2.25
Stanford Research Inst Menlo Park Calif
Surface States Associated with Acid Sites on Solids,
S. Roy Morrison. 30 Jan 75, 16p ARO-6331.11-C
Contract DA-31-124-ARO(D)-438
Availability: Pub. in Surface Science, v50 P329-342 1975.

Descriptors: *Semiconductors, Surfaces, Acids, Solids, Electron donors, Interactions, Models, Reprints.
Identifiers: *Surface states, Lewis acids, Insulators.

It is shown that present models of Lewis acidity or basicity and of surface states on ionic solids have substantial overlap, although the former is designed to describe chemical interactions at the surface site, and the latter electron capture. The site requirements for a Lewis acid are compared to the requirements for an acceptor surface state to suggest under what conditions a site should exhibit both strong acidity and a deep surface state. The expected influence of electronic properties of the solid on acid strength, and the influence of absorbed water, acids or bases on surface state energies are discussed. Experimental measurements are reported where both chemical acidity measurements and electrical surface state measurements are made on a series of Lewis acids. A positive correlation is found. Where there is correlation, it is concluded that chemical interaction measurements should provide a valuable tool to describe the energy distribution of surface states on a semiconductor surface. Also, the use of the surface state models and measurements from semi-conductor physics should help in understanding and classifying acid and basic sites on ionic semiconductors and insulators. (Author)

AD-A016 559/7GA PC$3.25/MF$2.25
Illinois Univ At Urbana-Champaign Dept of Physics
Theory of the Optical Properties of Resonant States in Nitrogen-Doped Semiconductor Alloys,
Massimo Altarelli. 3 Feb 75, 13p ARO-11807.8-P
Contract DAHC04-74-C-0005
Availability: Pub. in Physical Review B, v11 n12 p5031-5042, 15 Jun 75.

Descriptors: *Semiconductors, Semiconductor doping, Nitrogen, Optical properties, Resonance, Gallium arsenides, Indium phosphides, Alloys, Impurities, Reprints.

The optical properties of N-doped semiconductor alloys, such as GaAs-P and In-GaP, are investigated theoretically in the range of compositions, near the direct-indirect crossover, in which the discrete electronic state associated with the nitrogen trap is degenerate with the conduction-band continuum near the center of the Brillouin zone. The resolvent-operator formalism is applied to obtain the density of states and the optical absorption and emission spectra, by approximating the short-range impurity potential by a Koster-Slater interaction and using a simple parametrized description of the density of states of the host alloy. The presence of the discrete autoionizing trap state is shown to produce a characteristic Fano resonance-antiresonance line shape, in agreement with recent experimental observations, and in contrast to earlier theoretical predictions of a sharp and resonantly enhanced emission spectrum. (Author)

AD-A016 660/0GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Silicon- and Selenium-Ion-Implanted GaAs Reproducibly Annealed at Temperatures up to 950 C.
Journal article,
Joseph P. Donnelly, William T. Lindley, and Charles E. Hurwitz. 7 Apr 75, 4p Rept no. JA-4506 ESD-TR-75-238
Contract F19628-73-C-0002
Availability: Pub. in Applied Physics Letters, v27 n1 p41-43, 1 Jul 75.

Descriptors: *Semiconductors, *Ion implantation, *Encapsulation, Gallium arsenides, Silicon, Selenium, Annealing, Substrates, Concentration(Composition), Reprints.

A pyrolytic Si3N4 encapsulation technique has been used to permit reproducible annealing of implanted GaAs at temperatures as high as 950 C. At low doses, electrical activity approximately 70% has been achieved for both Si and Se.

AD-A016 743/7GA PC$3.25/MF$2.25
State Univ of New York At Albany Dept of Physics
An EPR Study on High Energy Ion Implanted Silicon,
Y. H. Lee, P. R. Brosious, L. J. Cheng, and J. W. Corbett. 1974, 6p
Contract N00014-70-C-0296
Availability: Pub. in Ion Implantation in Semiconductors, p519-524 n.d.

Descriptors: *Ion implantation, *Silicon, *Amorphous materials, Annealing, High energy, Electron paramagnetic resonance, Layers, Crystal lattices, Nitrogen, Temperature, Reprints.

EPR is used to study the lattice disorder produced by the C(+) and N(+) implantation in silicon in the high-energy range 0.55-3.50 Mev. Two new EPR spectra, Si-A12 (anisotropic) and -A13 (isotropic) are resolved for E > 1.65 Mev. Isochronal annealing shows that the amorphous line does not completely anneal at 700 C. The depth of the amorphous layer is roughly proportional to square root of(E) in the high-energy range. (Author)

AD-A016 744/5GA PC$3.25/MF$2.25
State Univ of New York At Albany Dept of Physics
Techniques for Studying Ion Implantation in Diamond,
J. F. Morhange, R. Beserman, J. C. Bourgoin, P. R. Brosious, and Y. H. Lee. 1974, 5p
Contract N00014-70-C-0296
Availability: Pub. in Ion Implantation in Semiconductors, p457-461 n.d.

Descriptors: *Ion implantation, *Diamonds, *Point defects, Electron paramagnetic resonance, Raman spectra, Scattering, Luminescence, Damage, Measurement, Absorption, Reprints.
Identifiers: Optical absorption.

Measurements using electron paramagnetic resonance, optical absorption, Raman scattering and luminescence have been performed in ion implanted type 2a diamonds. Results are described which show how these techniques can be used to monitor the total amount of damage as well as the behaviour of point defects introduced by implantation. (Author)

AD-A016 754/4GA PC$5.75/MF$2.25
Princeton Univ N J Dept of Electrical Engineering
Chemical Trends in Oxygen Uptake Rates at the Ordered Surfaces of Tetrahedrally Coordinated Compound Semiconductors.
Technical rept.,
Peter Mark, and William F. Creighton. 28 Apr 75, 6p Rept no. TR-28
Contract N00014-75-C-0394
Availability: Pub. in Applied Physics Letters, v27 n7 p400-403, 1 Oct 75.

Descriptors: *Semiconductors, Schottky barrier devices, Bonding, Surfaces, Oxidation, Oxygen, Models, Semiconductor devices, Reprints, Gallium arsenides, Silicon, Cadmium sulfides, Zinc, Gallium phosphides.

It is observed that oxygen uptake at ordered free surfaces of tetrahedrally coordinated semiconductors decreases with increasing bonding ionicity. This behavior is compared with the dependence of the contact potential at a Schottky barrier on the semiconductor bonding ionicity, and an explanation based on the Mead-Spitzer and Phillips models is suggested. (Author)

AD-A016 756/9GA PC$5.25/MF$2.25
Intelcom Rad Tech San Diego Calif
Study of the Effects of Radiation on the Electrical and Optical Properties of HgCdTe.
Final rept. 15 Apr 72-30 Apr 75,
Charles E. Mallon, Barry A. Green, Roland E. Leadon, and James A. Naber. 31 May 75, 110p Rept no. RT-8027-019 AFCRL-TR-75-0310
Contract F19628-72-C-0311
See also report dated 31 Dec 74, AD-A008 050.

Descriptors: *Infrared detectors, *Radiation effects, Cadmium tellurides, Mercury compounds, Tellurides, Electrical properties, Hall effect, Carrier mobility, Semiconductor devices, Neutrons, Electron irradiation, Optical properties, Charge carriers, Gamma rays, Photoconductivity, Temperature.
Identifiers: Mercury tellurides.

This report presents the results of experimental and theoretical investigations of the effects of electron, neutron, and gamma irradiations on the optical and electrical properties of the alloy semiconductor HgCdTe. The objective of the study is to obtain sufficient radiation effects data to enable prediction of the radiation response of infrared detector devices fabricated from HgCdTe. Section 2 discusses the results of a 14-MeV neutron irradiation at 80 K on n-type Hg(0.8)Cd(0.2)Te. The results of 80 K 5-MeV electron and fission neutron irradiations and isochronal anneal of p-type Hg(0.8)Cd(0.2) Te are discussed in Section 3. In Section 4 the results of various types of irradiations at 10 and 80 K are summarized and presented in terms of damage parameters that are then applied to HgCdTe photoconductive detectors to predict response degradation. Section 4 also includes a qualitative discussion of possible damage mechanisms in HgCdTe photovoltaic detectors.

AD-A016 918/5GA PC$3.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Magnetic Properties of Single Crystal CuNi-18H and MgZn-18H Solid Solutions.
Technical rept.,
R. O. Savage, A. Tauber, and J. R. Shappirio. Nov 75, 8p Rept no. ECOM-4363

Descriptors: *Barium ferrites, *Solid solutions, *Magnetic materials, Copper compounds, Nickel compounds, Magnesium compounds, Zinc compounds, Magnetic properties, Microwave equipment.
Identifiers: Magnetic anisotropy, Hexagonal lattices.

Hexagonal ferrites have been under investigation at this laboratory for several years as both potential narrow and broad ferrimagnetic resonance linewidth materials for several device applications at microwave and millimeter wave frequencies. Recently a new 18-layer structure Ba5Me2Ti3Fe12O31 where Me=Zn, Mg, Co, and Cu was discovered and several compositions have been investigated. In this paper the magnetic properties of two solid solutions MgZn-18H and CuNI-18H have been investigated as a function of temperature. The CuNi system is of interest for two reasons: Attempts to obtain end member Ni containing crystals have been unsuccessful and Ni containing hexagonal ferrites exhibit small temperature coefficients of magnetization. The latter is an important property for device applications. The second reason relates to the influence of Cu(2+) ions in creating uniaxial anisotropy.

AD-A016 936/7GA PC$7.00/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
Theoretical Considerations of Tunneling through Thin Film Heterojunctions.
Technical memo.,
William C. Liepold. 3 Mar 75, 200p Rept no. TM-75-41
Contract N00017-73-C-1418
Master's thesis.

Descriptors: *Tunneling(Electronics), *Semiconductor junctions, Thin films, Band theory of solids, Semiconducting films, Mathematical analysis, Disorder, Electric fields, Theses.
Identifiers: Metal insulator metal junctions, *Heterojunctions, Amorphous semiconductors.

An 'atomic' barrier model of a metal-insulator-metal heterojunction is developed. This one-dimensional model consists of a square barrier, containing a number of uniformly spaced 'atomic' wells, between two Bohr-Sommerfeld metals. Within this model, the elastic tunneling transmission coefficient is calculated without approximation for a variety of externally applied electric fields. Several approximation schemes, based on extension of Zener's modified WKB approximation for interband tunneling, are considered. The effect of disorder on the nature of the electronic wavefunction in the insulating barrier is examined within the 'atomic' barrier model. A method of characterizing the nature of the electronic states near the 'band' edges of a thin topologically disordered insulating region is developed and interpreted in terms of theoretical notions which apply strictly only to bulk samples.

AD-A016 964/9GA PC$6.25/MF$2.25
IBM Thomas J Watson Research Center Yorktown Heights N Y
The Physics of Reliability of Future Electronic Devices.
Semi-annual technical rept. no. 1, 1 Jun-Nov 75.

Thomas H. DiStefano, and King-Ning Tu. 30 Nov 74, 154p AFCRL-TR-75-0222
Contract F19628-74-C-0077
See also semi-annual technical rept. no. 2 dated 30 Nov 75, AD-A016 965.

Descriptors: *Semiconductor devices, *Interfaces, *Metal oxide semiconductors, *Dielectrics, Silicon dioxide, Schottky barrier devices, Photoelectric emission, Surface properties, Diffusion, Ionization, Ion implantation, Current density, Silicides, Silicon, Test methods, Reliability(Electronics), Tracer studies, Argon, Xenon, Thin films, Defects(Materials), Amorphous materials.
Identifiers: Dielectric breakdown, Photoelectron spectroscopy.

The following investigations are discussed in the report: (1) A dielectric breakdown model for wide bandgap insulators has been developed using the concept of impact ionization; For SiO2, it predicts a current density and an average field at breakdown which increase rapidly for film thickness below 200A, indicating that a thin gate insulator may be advantageous in MOS devices. (2) Semiconductor surface states at metal-semiconductor interface have been measured for the first time using a new photoelectron spectroscopy technique; (3) A scanned surface photovoltage method has been developed to produce images that have a resolution of the order of 2 micrometers. The scanned surface photovoltage technique is very powerful as a diagnostic tool in silicon processing. (4) Implanted noble gas atoms of Ar and Xe have been used as diffusion markers in growth studies of several silicide thin films.

AD-A016 965/6GA PC$5.25/MF$2.25
IBM Thomas J Watson Research Center Yorktown Heights N Y
The Physics of Reliability of Future Electronic Devices.
Semi-annual technical rept. no. 2,
Thomas H. DiStefano, and King-Ning Tu. 30 Nov 75, 122p AFCRL-TR-75-0412
Contract F19628-74-C-0077
See also semi-annual technical rept. no. 1 dated 30 Nov 74, AD-A016 964.

Descriptors: *Semiconductor devices, *Interfaces, *Metal oxide semiconductors, *Dielectrics, Dipole moments, Schottky barrier devices, Silicon nitrides, Silicon, Substrates, Electron transport, Holes(Electron deficiencies), Valence bands, Amorphous materials, Diffusion, X ray diffraction, Band theory of solids, Gold, Silicides, Defects(Materials), Integrated circuits, Test methods, Surface reactions, Backscattering, Sputtering.
Identifiers: Photoemission spectroscopy, Dielectric breakdown.

The following investigations are discussed in the report: (1) At several metal-SiO2 interfaces, it was found that interdiffusion of the metal into the insulator induces a dipole layer which comprises a significant portion of the surface potential. The significance of this finding is that surface effect devices (MOS,CCD), which depend upon a stable surface potential, may be sensitive to changes in the dipole layer produced by time, temperature, electric fields, and impurities; (2) Transport measurements were performed on Si3N4 films deposited on Si. The valence band structure of Si3N4 and amorphous SiO2 has been examined by X-ray photoemission spectroscopy; (3) Near-noble metals react with Si single crystals to form a metal-rich silicide at 100C to 200C. The low temperature reaction is explained by proposing an interstitial model; (4) A review on the nature of thin film interfacial reactions with examples from the field of integrated circuits is given. The study of the reactions can be facilitated by a combination of three analytical tools--depth profiling by nuclear backscattering, surface analytical techniques combined with layer removal by sputtering and glancing angle X-ray diffraction.

COM-75-50557/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Algorithm for Computing the Number of Independent Real Parameters in the Phonon Dynamical Matrix.
Final rept.,
R. C. Casella. 15 Jun 75, 6p
Pub. in Physical Review B, v11 n12 p4795-4800, 15 Jun 75.

Descriptors: *Phonons, Matrices(Mathematics), Neutron scattering.
Identifiers: Reprints.

No abstract available.

COM-75-50641/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Neutron Diffraction Study of Sputtered and Annealed Tb-Fe Alloys.
Final rept.,
S. Pickart, J. Rhyne, H. Alperin, and H. Savage. 25 Feb 74, 2p
Sponsored in part by Naval Ordnance Lab., White Oak, Md.
Pub. in Physics Letters A, v47 n1 p73-74, 25 Feb 74.

Descriptors: *Terbium alloys, *Iron containing alloys, *Neutron diffraction, Crystal structure, Magnetic properties, Sputtering, Metal films.
Identifiers: Reprints, Amorphous materials.

Sputtered alloys of composition Tb(x)Fe(1-x) with x = 0.118, 0.45 and 0.75 were shown by neutron diffraction to be amorphous. Linewidth measurements of an anealed sputtered sample with x = 0.333 indicate microcrystallinity with a particle size of approximately equal to 100A.

N75-31622/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
On the Magnon Interaction in Haematite. 2: Magnon Energy of the Acoustical Mode and Magnetic Critical Fields.
N. L. Bonavito, O. Nagai, and T. Tanaka. Aug 75, 23p NASA-TM-X-70971, X-932-75-207
Subm-Submitted for Publication.

Descriptors: *Acoustic properties, *Critical temperature, *Hematite, *Magnons, Antiferromagnetism, Spin exchange.

For abstract, see STAR 1322

N75-31908/7GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Search for Solid Conductors of NA(+) And K(+) Ions: Five New Conductors.
J. Singer, H. Kautz, W. Fielder, and J. Fordyce. 1975, 26p NASA-TM-X-71753, E-8377
Conf-Presented at AM. Ceramic Soc., Washington, D. C., 3-7 May 1975.

Descriptors: *Electric conductors, *Ion currents, *Potassium, *Sodium, Activation energy, Body centered cubic lattices, Crystal structure, Electrical resistivity.

For abstract, see STAR 1322

N75-31909/5GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C.
Alkali Oxide-Tantalum, Niobium and Antimony Oxide Ionic Conductors.
Final Report, 1 Jan. - 31 Dec. 1974.
R. S. Roth, W. S. Brower, H. S. Parker, D. B. Minor, and J. L. Waring. Apr 75, 77p NASA-CR-134869, NBSIR-75-754
NASA ORDER C-50821-C

Descriptors: *Alkaline earth oxides, *Antimony compounds, *Ion currents, *Niobium oxides, Chemical composition, Crystal growth, Ion exchanging, Ionic mobility, Potassium compounds, Rubidium compounds.

For abstract, see STAR 1322

PAT-APPL-578 843/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Stabilization and Control of Acoustic Surface Wave Devices.
Patent Application,
Max Epstein. Filed 19 May 75, 13p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Thin films, *Acoustic delay lines, Substrates, Electroacoustic transducers, Patents.
Identifiers: *Patent applications.

The patent application describes a thin film acoustic surface wave device having input and output transducers selectively spaced apart by a prescribed distance. Signals applied to the input transducer are propagated along the surface of the thin film and received by the output transducer. A delay is established which is proportional to the prescribed spacing and to the strain (i.e. tension or compression) which is applied to the device. The thin film surface acoustic wave device is manipulated by an appropriate application of the strain which in turn advantageously provides a variation in phase velocity. Such phase variation may be accurately controlled to yield variable oscillators, variable filters and other devices which vary as a function of the phase velocity. Also, means are provided for inducing strain electrically and mechanically so that the phase velocity across the surface of the substrate may be controlled.

20M. Thermodynamics

AD-A016 307/1GA PC$3.25/MF$2.25
National Bureau of Standards Washington D C Heat Div
Molecular Dynamical Studies of the Properties of Solids under Pressure.
Rept. no. 2 (Final), 1 Aug 74-31 Jul 75,
D. H. Tsai, and R. A. MacDonald. 19 Sep 75, 8p ARO-10250.3-P

Descriptors: *Solids, *Solid state chemistry, *Transport properties, *Thermal shock, Heat transfer, Shock waves, Thermal resistance, Thermal diffusion, Crystals, Thermal conductivity, Energy transfer.
Identifiers: Impact shock, Intermolecular forces, Lattice energy, Second sound.

The long-range objective of this project is to develop and apply the method of molecular dynamics to the study of the thermodynamic and transport properties of solids under high-pressure, high-temperature conditions, such as those encountered in the shock compression of a solid or in the detonation of a reacting material. The main objective of the past year was to study the transport of thermal energy in a solid under steady and pulsed heating. The purpose is to compare the molecular dynamical results with existing results so as to obtain a critical evaluation of the basic molecular dynamical method. In addition, the phenomenon of second sound observed in our earlier calculations of the shock compression of a solid might be understood.

AD-A016 672/8GA PC$7.50/MF$2.25
Systems Science and Software La Jolla Calif
CAPO User's Guide. Volume I.
Final rept.,
Ira Katz, Robert C. Vik, and James Harvey. 18 Jun 75, 236p Rept no. SSS-R-74-2364 DNA-3600F-1
Contract DNA001-73-C-0061

Descriptors: *Plasmas(Physics), *Equations of state, *Computer programming, Thermodynamics, Gas ionization, Computations, FORTRAN, Instruction manuals.
Identifiers: *CAPO computer code, FORTRAN 5 programming language, UNIVAC 1108 computers.

This CAPO User's Guide serves as a complete reference manual on the concept, theory, and operation of the CAPO equation of state/opacity codes. Volume I contains program documentation.

COM-75-50554/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Heat Transfer Between Sub-Micron Silver Powder and Dilute He3 He4 Solutions.
Final rept.,
Ray Radebaugh, J. D. Siegwarth, and J. C. Holste. 7 May 74, 4p
Pub. in Proceedings of International Cryogenic Engineering Conference (5th), Kyoto (Japan), Paper H6 p242-245, 7 May 74.

Descriptors: *Cryogenics, *Thermal resistance, Heat transfer, Helium 3, Liquid helium, Helium 4, Silver.
Identifiers: Reprints.

The thermal resistance between copper cells lined with silver powder of 0.1--0.2 micrometer diameter and a dilute stream of He3 in He4 was measured between 15 and 250 mK. The results show that this powder can give an order of magnitude lower thermal resistance at 15mK than an equal volume of copper powder of 1.8 micrometer diameter. The scientific and engineering significance of such a low resistance in a small volume is discussed. At the higher temperatures R is proportional to (1/T), which can be explained by a liquid thermal resistance and a resistance at the joint between the powder and the cell walls.

COM-75-50624/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Inelastic Neutron Scattering from a Liquid 3He-4He Mixture.
Final rept.,
J. M. Rowe, D. L. Price, and G. E. Ostrowski. 20 Aug 73, 4p
Pub. in Physical Review Letters, v31 n8 p510-513, 20 Aug 73.

Descriptors: *Liquid helium, *Neutron scattering, Inelastic scattering, Superfluidity, Excitation, Mixtures, Least squares method, Helium 3, Helium 4, Cryogenics.
Identifiers: Rotons, Reprints.

Inelastic neutron-scattering-measurements on liquid 3 He(.05)4He(.95) in the Q region from 0.8 to 2.3/A at 1.6 K are reported. The shifts and increases in natural line-width of the single excitation peaks relative to pure 4He at the same temperature were determined by a least-squares fitting procedure. The shifts vary from a small, possibly negative, value at the roton minimum to positive values around 0.5 K at both ends of the Q range. The full widths at half-maximum of the extra broadening vary from 0.5 K to 1.5 K over the same range.

N75-31871/7GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Calculation of the Initial Thickness of the Microlayer in Nuclear Boiling.
G. F. Smirnov. Sep 75, 14p NASA-TT-F-16573
Contract NASW-2790
Tran-Transl. Into English from Inzh.-Fiz. Zh. (Ussr), V. 28, Mar. 1975 p 503-508.

Descriptors: *Film thickness, *Fluid films, *Nucleate boiling, Bubbles, Heat transfer, Vapors.
Identifiers: Translations.

For abstract, see STAR 1322

20N. Wave Propagation

AD-A016 320/4GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Effective Conductivity, Dielectric Constant and Permeability of a Dilute Suspension,
Joseph B. Keller. 6 Nov 74, 10p Rept no. EL-53
Contract N00014-67-A-0467-0015
Availability: Pub. in Phillips Research Reports, v30 p83-90 1975.

Descriptors: *Electromagnetic fields, *Dielectric properties, *Electrical conductivity, *Permeability(Magnetic), *Electromagnetic wave propagation, Spheres, Particles, Interactions, Reprints.
Identifiers: Dielectric constants.

The effective dielectric constant, magnetic permeability and electrical conductivity are calculated for a medium containing a suspension of particles with different electrical properties. The results are valid for small concentrations of particles, and contain terms up to and including terms of first order in the concentration. The method of analysis is that given by Landau and Lipshitz for finding the effective conductivity. A procedure for extending the results to higher concentrations is also given. Some specific results for spherically symmetric particles are included. (Author)

AD-A016 448/3GA PC$3.25/MF$2.25
Stanford Univ Calif Stanford Electronics Labs
Scattering of Millimeter Waves in Line-of-Sight Propagation.
Final rept. 1 Aug 73-31 Mar 75,
Alan T. Waterman, Jr. Aug 75, 23p Rept no. SU-SEL-75-041 AFCRL-TR-75-0465
Contract F19628-74-C-0013
See also report dated Aug 73, AD-772 824.

Descriptors: *Millimeter waves, *Electromagnetic wave propagation, *Atmospheric scattering, Line of sight, Troposphere, Covariance, Radio transmission, Bandwidth, Rain.

Line-of-sight propagation measurements at 34.89 GHz and 11.63 GHz on a 28 km path are analyzed with particular emphasis on (a) transmissable bandwith and (b) the effects of rain. Bandwidth studies are approached by measuring the frequency covariance of the 3:1 frequency ratio employed, and then using the theory of weak scattering to infer the covariance of signal fluctuations at lesser frequency separations. The conclusions reached from this approach indicate negligible bandwith limitations for bandwidths of a few per cent (300-400 MHz, at 35 GHz), as a consequence of single scattering processes; i.e., the inferred frequency covariance between extremes in the band should exceed 0.95. The effects of rain, while showing up markedly in attenuation at the higher frequency, do not have other consistently deleterious consequences. Angle-of-arrival jitter is relatively unaffected. Frequency covariance is more erratic during squally weather but tends to rise during times of heavy rain.

AD-A016 449/1GA PC$5.25/MF$2.25
Advanced Technology Center Inc Dallas Tex
A Study of Electromagnetic Wave Interactions with Air Plasmas.
Final rept. 15 Dec 72-30 Jun 75,
William H. Rudderow. Jul 75, 103p Rept no. ATC-B-94300/5CR-28 AFCRL-TR-75-0418
Contract F19628-73-C-0140

Descriptors: *Radio transmission, *Plasma Medium, Microwaves, Plasma sheaths, Reentry vehicles, Atmosphere entry, Interactions, Air.

An experimental study was performed to study the effect of thin plasma layers upon the transmission characteristics of low and high power microwave transmission. A high performance shock tube using dry air as the test gas was used to generate the plasma. Plasma conditions were established to simulate the reentry environment encountered during the terminal phases of a slender reentry vehicle. Flush mounted X band waveguide aperture antennas or special H-plane horn antennas were used to launch and detect the microwave signals. Thin plasma layers were cut from the shock-generated plasma using sharp-edged ground planes mounted inside the shock tube. Initial shock tube pressures were established at 5.0 torr or 10.0 torr while the shock velocities were varied to produce electron densities of 10 to the 11th power - 10 to the 14th power/cu. cm. Diagnostic measurements were performed with various flush mounted electrostatic probes, stagnation point electrostatic probe, and supporting static pressure gages.

AD-A016 518/3GA PC$3.25/MF$2.25
Texas Univ At Austin Applied Research Labs
Upper Limit on the Use of Weak-Shock Theory,
F. M. Pestorius, and Solon B. Williams. 7 Sep 73, 3p AFOSR-TR-75-1440
Contract F44620-71-C-0015
Availability: Pub. in Jnl. of the Acoustical Society of America, v55 n6 p1334-1335 Jun 74.

Descriptors: *Shock waves, Wave propagation, Theory, Amplitude, Sawtooth waveforms, Intensity, Waveform generators, Reprints.

The use of weak-shock theory fails to describe adequately the behavior of very intense finite-amplitude waves. In this letter, we report the development of an improved version of the weak-shock result that is used to predict the propagation of sawtooth waves. This new result is then used to investigate the upper limit on the strength of waves that may be accurately modeled by the use of ordinary weak shock theory. (Author)

AD-A016 583/7GA PC$4.25/MF$2.25
Naval Research Lab Washington D C
An Integral Equation Method for Electromagnetic Scattering Problems.
Interim rept.,
Arthur K. Jordan. Oct 75, 55p Rept no. NRL-MR-3147

Descriptors: *Electromagnetic scattering, *Integral equations, Matrices(Mathematics), Computations, Computer applications, Radar cross sections.

The purpose of this memorandum report is to document the analysis which was performed to obtain the matrix equation which represents the electromagnetic fields scattered from axially symmetric targets. Although these results are not new, the analysis is presented in a concise, logical manner which is suitable for computer programming and which provides the foundation for the solution of diverse transient electromagnetic scattering problems by the newer methods of natural mode representations and singularity expansion techniques. The motivation for this study was to formulate

in an understandable manner the necessarily complicated and tedious electromagnetic scattering calculations. Even relatively simple targets, e.g., missiles and torpedoes, require lengthy calculations. The integral equation for electromagnetic scattering from axially symmetric targets is derived. The boundary conditions for the case of metallic (perfectly conducting) and for the case of lossy dielectric targets are applied. The integral equation is reduced to matrix form by application of the method of moments. The scattering cross section is derived. A typical target geometry (sphere-cone-sphere) is used as an example. The detailed calculations are documented for reference with future computer calculations.

N75-31181/1GA PC$3.25/MF$2.25
Groupe de Recherches Ionospheriques, Issy-les-Moulineaux (France).
Preliminary Test of the Electromagnetic Cleanliness of the Geos Bac Test Chamber and Environmental Noise Tests of the Hafren Site in U/ELF and VLF Frequency Ranges.
B. Duboysdelavigerie, J. F. Karczewski, A. Meyer, and F. X. Sene. May 74, 17p
GRI/NTP/130

Descriptors: *Electromagnetic noise measurement, *Magnetic probes, *Test chambers, *Very low frequencies, Electromagnetic fields, Electromagnetic shielding, Environmental tests, Geos satellites (Esro), Great britain, Sites, Test facilities.

For abstract, see STAR 1322

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A016 446/7GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
The Development of an Optically Active Laser Schlieren System with Application to High Pressure Solid Propellant Combustion.
Master's thesis,
James Randolph Andrews. Sep 75, 79p

Descriptors: *Solid rocket propellants, *Combustion, *Flow visualization, Schlieren photography, Test equipment, Lasers, Ammonium perchlorate, Surface properties, Turbulent flow, Pressure distribution, Theses.

A laser schlieren system, using an optically active single-piece quartz prism-polaroid sheet combination aperture in place of the conventional knife edge, was developed and applied to high pressure solid propellant combustion studies. Advantages and limitations of the system are discussed. Ammonium perchlorate deflagration was observed to pressures of 2500 psi. Distinct surface reaction sites were evidenced in the gas phase at high and low pressures by alternating density gradients across the surface. These sites were found to be very small or nonexistent at intermediate pressures.

AD-A016 454/1GA PC$6.25/MF$2.25
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
Turbulence in Free Diffusion Flames of Hydrogen-Nitrogen Mixtures Burning in Still Air.
Final rept. Aug 71-Dec 72,
Roger R. Craig. Jun 75, 160p Rept no. AFAPL-TR-74-68

Descriptors: *Combustion, *Flames, Combustion chambers, Gas flow, Jet flow, Diffusivity, Turbulence, Axial flow turbines, Hydrogen, Nitrogen, Momentum, Turbulent flow, Flux density.
Identifiers: *Velocity measurement, Diffusion flames.

The research undertaken in this report deals with the measurement of time averaged flow variables and turbulence intensities in turbulent diffusion flames. The difficulties encountered in separating the effects of temperature, velocity and species concentration on a hot-film anemometer signal required the use of special techniques for measuring the turbulence in the diffusion flames. Results obtained in an axisymmetric air jet are compared with data obtained from a crossed hot-film anemometer. The axial turbulence equations are then derived. Large increases in the axial turbulence intensity, as well as in the jet core length, are found in the diffusion flame, along with reductions in the radial turbulence intensity. Results are examined in light of the general momentum and turbulence intensity equations for flows with density fluctuations and are seen to be consistent with effects deducible for a density-velocity fluctuation correlation.

N75-31399/9GA PC$3.75/MF$2.25
European Space Research Organization, Paris (France).
Flame Stabilization in Afterburning Flows at High Pressure by Means of Air or Liquid Jets.
W. Dobrzynski, and K. Baumann. Mar 75, 36p
ESRO-TT-153, DLR-FB-74-59
Tran-Transl. Into English of "Flammenstabilisierung in Nachbrennerstroemungen Hohen Druckes MIT Luft- Oder Fluessigkeitsstrahlen", Dfvlr, Brunswick Report Dlr-FB-74-59, 23 Jul. 1974. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 16 Dm.

Descriptors: *Afterburning, *Air jets, *Flame stability, *Liquid injection, High pressure, High temperature gases, Hydrogen peroxide, Stabilization.
Identifiers: Translations.

For abstract, see STAR 1322

21C. Electric Propulsion

N75-31210/8GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Accelerated Life Test of Sputtering and Anode Deposit Spalling in a Small Mercury Ion Thruster.
J. L. Power. Sep 75, 40p NASA-TM-X-3269, E-8152

Descriptors: *Anodes, *Ion engines, *Spalling, *Sputtering, Accelerated life tests, Mercury vapor, Molybdenum, Surface layers, Tantalum.

For abstract, see STAR 1322

N75-31211/6GA PC$5.75/MF$2.25
Martin Marietta Corp., Denver, Colo. Planetary Systems Mission Analysis and Operations Section.
Mission Analysis Program for Solar Electric Propulsion (Mapsep). Volume 1: Analytical Manual.
P. E. Hong, G. L. Shults, R. J. Boain, K. R. Huling, and T. Wilson. Oct 74, 148p NASA-CR-143934
Contract NAS8-29666
Misc-Revised.

Descriptors: *Computer programs, *Mission planning, *Solar electric propulsion, *Trajectory analysis, Computerized simulation, Error analysis, Orbital mechanics, Thrust programming, Trajectory optimization.

For abstract, see STAR 1322

N75-31212/4GA PC$7.00/MF$2.25
Martin Marietta Corp., Denver, Colo. Planetary Systems Mission Analysis and Operations Section.
Mission Analysis Program for Solar Electric Propulsion (Mapsep). Volume 2: User'S Manual.
G. L. Shults, R. J. Boain, K. R. Huling, T. Wilson, and P. E. Hong. Oct 74, 185p NASA-CR-143935
Contract NAS8-29666
Misc-Revised.

Descriptors: *Computer programs, *Mission planning, *Solar electric propulsion, *Trajectory analysis, *User manuals (Computer programs), Computerized simulation, Error analysis, Input/output routines, Orbital mechanics, Thrust programming, Trajectory optimization.

For abstract, see STAR 1322

N75-31213/2GA PC$13.25/MF$2.25
Martin Marietta Corp., Denver, Colo. Planetary Systems Mission Analysis and Operations Section.
Mission Analysis Program for Solar Electric Propulsion (Mapsep). Volume 3: Program Manual.
K. R. Huling, R. J. Boain, T. Wilson, P. E. Hong, and G. L. Shults. Oct 74, 584p NASA-CR-143936
Contract NAS8-29666
Misc-Revised.

Descriptors: *Computer programs, *Mission planning, *Solar electric propulsion, *Trajectory analysis, *User manuals (Computer programs), Computerized simulation, Error analysis, Logic design, Orbital mechanics, Subroutines, Thrust programming, Trajectory optimization.

For abstract, see STAR 1322

N75-31214/0GA PC$4.75/MF$2.25
Deutsche Gesellschaft fuer Luft- und Raumfahrt, Cologne (West Germany).
State-of-the-ART of Aerospace Propulsion Systems in the Federal Republic of Germany.
3 Apr 75, 78p DGLR-MITT-75-08
In German; English Summary.

Descriptors: *Chemical propulsion, *Electric propulsion, *Gas turbine engines, *High energy propellants, *Noise reduction, Cryogenic rocket propellants, Germany, Ion engines, Research and development, Space tugs.

For abstract, see STAR 1322

21D. Fuels

AD-A016 429/3GA PC$3.75/MF$2.25
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
The Chromatographic Analysis of JP-9 Fuel.
Interim Rept. Oct-Nov 74,
Ronald D. Butler. Jun 75, 31p Rept no. AFAPL-TR-75-3

Descriptors: *Jet engine fuels, *Gas chromatography, Data processing, On line systems, Automatic, Sampling, Chromatographic analysis.

A rapid and accurate gas chromatographic method has been developed for the analysis of JP-9 synthetic fuel. Automatic sampling and on-line data processing make it possible to operate continuously. Results for any one fuel component are accurate to within + or - 2% absolute, and the total analysis time is one hour or less. The method is equally applicable to manual operation with conventional instrumentation. (Author)

AD-A016 433/5GA PC$7.50/MF$2.25
Science Applications Inc Mclean Va
Analysis of the Energy Resources and Demand of Western Europe.
Final technical rept. Jun 74-Mar 75,
J. F. Schneider, K. D. Dance, R. C. Lind, R. B. Ryan, and A. R. Williams. Jul 75, 248p Rept no. SAI-74-630-WA RADC-TR-75-199

Contract F30602-74-C-0357, ARPA Order-2339

Descriptors: *Western Europe, Fuel consumption, Coal, Nuclear energy, Oils, Natural gas, Electricity, Residential section, Industries, Transportation, Commerce, Resources, Production, Energy gaps, Economic analysis, Geopolitics, Belgium, France, West Germany, Netherlands, Norway, Denmark, Forecasting, Great Britain.
Identifiers: *Energy resources, *Energy demand, Electric power consumption, Energy consumption, European Economic Community, Synthesis gas, Manufactured gas, Economic impact, Energy shortages, Luxembourg, United Kingdom.

This report examines the future demand for energy of Western Europe through the year 1985. Particular attention is given to the impact of the tripling of the price of oil on total energy demand, demand for oil, and the development of competitive sources of energy in terms of increased domestic resources and alternate sources of supply to the Organization of Petroleum Exporting Countries (OPEC). The forecast energy demand by consuming sector and the projected supplies by fuel of the EEC(9) are developed. Various geopolitical scenarios which could arise from the European energy situation are discussed. The potential for technology transfer from the U.S. is briefly examined.

AD-A016 531/6GA PC$3.25/MF$2.25
Aerospace Corp El Segundo Calif Materials Sciences Lab
Volatile Matter Released from Coals.
Interim rept.,
Francis M. Wachi, and Donald E. Gilmartin. 30 Sep 75, 23p Rept no. TR-0076(6950-07)-3
SAMSO-TR-75-233
Contract F04701-75-C-0076

Descriptors: *Coal, Carbon dioxide, Carbon monoxide, Methane, Water vapor, Kinetics, Potential energy, Heat transfer, Thermal stability, Volatility.
Identifiers: *Anthracite, *Degassing, Decrepitation, Thermal efficiency, Metallurgical fuels.

The degassing behavior of St. Nicholas anthracite has been investigated at 25 - 1400C in vacuum. Relevant data have been obtained that could help provide a more complete understanding of the decrepitation phenomenon that precludes the use of anthracites as metallurgical fuel.

AD-A016 592/8GA PC$4.75/MF$2.25
Exxon Research and Engineering Co Linden N J Government Research Lab
Development of High Stability Fuel.
Mid-term rept. 1 Apr-31 Jul 75 on Phase 2,
William F. Taylor, and John W. Frankenfeld. Jul 75, 83p Rept no. GRU.14GAHF.75
Contract N00140-74-C-0618
See also Phase 1, AD-A007 574.

Descriptors: *Jet engine fuels, *Deposits, Olefin polymers, Sulfur, Nitrogen, Organic oxygen compounds, Fuel contamination, Deoxygenation, Thermal stability, Deposition.
Identifiers: JP-5 fuel.

A study of the effects of interactions between olefins and sulfur, nitrogen and oxygenated compounds in deoxygenated JP-5 has been initiated. This study is designed to determine what compound types can undergo interactions in this system and whether innocuous species may interact to form deleterious reaction products. The first interactions studied were between certain sulfur, nitrogen and oxygen compounds and olefins. These runs are complete. In addition, several runs have been made to investigate the interactions between nitrogen and sulfur containing compounds.

AD-A016 763/5GA PC$4.75/MF$2.25
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
Assessment of JP-8 as a Replacement Fuel for the Air Force Standard Jet Fuel JP-4. Part I. Assessment of JP-8/JP-4 Fuel in Noncombat Environment.
Final rept. Jun 72-Apr 75,
G. T. Beery, R. G. Clodfelter, G. W. Gandee, D. M. Spear, and D. C. Wight. Jun 75, 92p Rept no. AFAPL-TR-74-71-Pt-1

Descriptors: *Jet engine fuels, Physical properties, Flammability, Test methods, Acceptability, Assessment, Standards, Costs, Fire safety, Air pollution, Storage.
Identifiers: Aircraft exhaust, JP-4 fuel, JP-8 fuel, JP-5 fuel.

This report is an assessment of JP-8 as a replacement fuel for the Air Force standard jet fuel JP-4. All facets of the problem are examined including fire safety under combat and noncombat conditions, crash fire safety, storage, handling and maintenance safety, laboratory testing, gunfire testing, flight testing, cost and availability, and impact on current Air Force weapons systems. The report concludes that a significant improvement in overall fire safety could be achieved by conversion to JP-8 however, additional investigation into problems related to low temperature ground start and altitude relight should be accomplished prior to conversion.

COM-75-11474/4GA PC$3.25/MF$2.25
National Maritime Research Center-Kings Point, N.Y.
Alternate Energy Sources for Marine Power Plants,
Jose Femenia. Sep 75, 22p NMRD-KP-144
Prepared in cooperation with Webb Inst. of Naval Architecture, Glen Cove, N.Y. Center for Maritime Studies.

Descriptors: *Energy sources, *Marine propulsion, Residual oils, Distillates, Synthetic fuels, Hydrocarbon fuels, Fuel cells, Solar energy conversion, Wind power, Hydrazine, Power plants, Reviewing.
Identifiers: *Fuel substitution.

This report discusses the size of ship power plants and other factors governing the suitability of different types of fuel for marine use. It then considers various alternatives to traditional fuels derived from crude petroleum. Types of fuel considered are other liquid hydrocarbon fuels, both natural and synthetic, hydrocarbon fuels in solid, liquid/solid, and gaseous forms, non-hydrocarbon fuels and solar and wind energy.

PB-245 391/8GA PC$3.75/MF$2.25
Metropolitan Washington Council of Governments, D.C.
Energy Balance for the Washington Metropolitan Area for 1973.
Final rept.,
P. Graham, T. Markle, V. Krouse, and R. Haas. Jun 75, 48p
Grant HUD-CPA-D.C.-1011

Descriptors: *Fuel consumption, *Energy consumption, Metropolitan areas, District of Columbia, Air conditioning, Space heating, Hot water heating, Transportation, Diesel fuels, Coal, Residual oils, Distillates, Natural gas, Jet engine fuels, Gasoline, Wood, Electricity, Residential buildings, Commercial buildings, Industrial buildings, Energy policy, Planning, Maryland, Virginia.
Identifiers: *Electric power consumption.

A framework of accounts used in the metropolitan energy balance is presented for each of the following headings: resource type, fuel type, method of conversion, energy use, and demand sector. A table by fuel type of nonrenewable and renewable primary energy resources used in the metropolitan Washington area is presented. Energy use data are presented in three demand sectors: (1) commercial, industrial, and institutional, (2) residential, and (3) transportation. Energy use data are presented by fuel type and demand sector using the following accounts: space heat, water heat, air conditioning, process, ground passenger transportation, ground freight transportation and air transportation. A flow chart is presented showing how a metropolitan energy resources model is integrated into a metropolitan framework model used for forecasting the effects of alternative metropolitan management strategies over a specified planning period.

PB-245 671/3GA PC$11.50/MF$2.25
Booz-Allen and Hamilton, Inc., Bethesda, Md.
Emissions from Processes Producing Clean Fuels.
Final rept.,
F. Glazer, A. Hershaft, and R. Shaw. Mar 74, 446p BA-9075-015 EPA/450/3-75/028
Contract EPA-68-02-1358

Descriptors: *Synthetic fuels, *Manufactured gas, *Air pollution control, *Water pollution control, Desulfurization, Fuel oil, Oil shale, Coal gasification, Coal liquefaction, Tar sands, Feedstocks, Synthane, Hygas process, Energy consumption, Cost analysis, Capitalized costs, Operating costs, SRC process, Process charting, Synthesis gas, Sulfur inorganic compounds.
Identifiers: Coal liquid, Lurgi process, Carbon dioxide acceptor process, Koppers-Totzek process, COED process, U Gas process.

The objective of the research effort described in this report was to assess the technical feasibility and to estimate the costs of installing alternative pollution control systems on clean-fuel processes which are likely to become commercially viable within the next decade. The intent was not to establish standards but rather to: Determine the types and estimated amounts of pollutants generated in clean-fuel processes; Determine the degree of availability processes for minimizing emissions from these processes; Estimate the economic and energy costs for control of these emissions; Indicate possible means for utilizing the by-products from these processes in environmentally satisfactory ways. The primary emphasis in the study was placed on the control of sulfur emissions, although other pollutant streams were considered and evaluated as well.

PB-245 749/7GA PC$3.75/MF$2.25
Federal Power Commission, Washington, D.C. Bureau of Natural Gas.
Underground Storage of Natural Gas by Interstate Pipeline Companies, Calendar Year 1974. Winter 1974-1975.
Oct 75, 40p

Descriptors: *Gas storage, *Underground storage, *Natural gas, Fuel storage, Cost estimates, Fixed costs, Operating costs, Cost comparison, United States.
Identifiers: Eastern region(United States), Midwestern region(United States), Southern region(United States), Western region(United States).

Contents:
- Number of storage fields in 1974;
- Capacity, utilization, and certification of underground natural gas storage fields by jurisdictional pipeline companies in 1974;
- Estimated cost of storing gas underground in 1974;
- Winter 1974 - 1975 storage.

21E. Jet and Gas Turbine Engines

AD-A016 430/1GA PC$7.00/MF$2.25
Marquardt Co Van Nuys Calif
Low Cost Hypermixing Ejector Ramjet Program.
Final rept. 15 Jun 73-10 Feb 75,
Joseph G. Bendot, Wallace G. Harkins, and Thomas G. Piercy. Jun 75, 196p Rept no. MR-S-1322-A ARL-75-0219
Contract F33615-73-C-4093

Descriptors: *Ramjet engines, *Ejectors, Turbulent flow, Mixing, Jet engine fuels, Hydrazine, Vortices, Fluid flow.

The Air Force Aerospace Research Laboratories (ARL) recently made a technology breakthrough in the field of turbulent mixing. ARL experiments indicated that the spreading rate of a subsonic jet may be increased dramatically by the introduction of streamwise vortices in the flow. These vortices promote efficient turbulent mixing within an extremely short distance, i.e., hypermixing. The basic objective of this program was to assess the payoff, if any, of applying hypermixing ejector technology to the design of a low cost ejecto ramjet engine. Three variations of the ejector ramjet engine cycle were evaluated at the engine design point of Mach 0.75 at 20000 feet altitude. The fuel addition-mix/diffuse/burn cycle variation was clearly superior. The selected fuel was UDMH. Engine performance was estimated for the specified flight envelope, Mo = 0.70 to 1.20 and sea level to 30000 feet altitude. An annular ring ejector which incorporated hypermixing technology was designed, fabricated, and experimentally evaluated.

N75-31002/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Holographic Flow Visualization within a Rotating Compressor Blade Row.
W. A. Benser. Aug 75, 11p NASA-TM-X-71788, E-7622

Descriptors: *Compressor blades, *Flow visualization, *Holography, Leading edges, Rotors, Ruby lasers, Shock wave profiles, Transducers, Turbofan engines.

For abstract, see STAR 1322

N75-31006/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
An Experimental and Analytical Investigation of Axisymmetric Diffusers.
L. A. Povinelli. 1975, 15p NASA-TM-X-71786, E-8451
Conf-Presented at 11TH Propulsion Conf., Anaheim, Calif., 29 Sep. - 1 Oct. 1975; Cosponsored by Aiaa and Sae.

Descriptors: *Computer programs, *Finite difference theory, *Supersonic diffusers, Compressible flow, Performance prediction, Pressure recovery, Turbulent flow.

For abstract, see STAR 1322

N75-31014/4GA PC$3.75/MF$2.25
Politecnico di Torino (Italy). Ist. di Macchine e Motori per Aeromobili.
Pressure Waves Propagation Through Bladings in Axial Flow Compressors.
M. Pandolfi, and L. Zannetti. May 74, 32p PUBL-161

Descriptors: *Computerized simulation, *Elastic waves, *Turbocompressors, *Unsteady flow, *Wave propagation, Boundary value problems, Compressor blades, Graphs (Charts), Hyperbolic differential equations, Mathematical models, Numerical analysis, Performance prediction.

For abstract, see STAR 1322

N75-31018/5GA PC$3.75/MF$2.25
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Berlin (West Germany). Inst. fuer Turbulenzforschung.
Application of Similarity Laws to the Blade Passage Sound of Centrifugal Fans.
W. Neise. 6 Mar 75, 35p DLR-FB-75-30
Subm-Sponsored by Deut. Forschungsgemeinschaft.

Descriptors: *Anechoic chambers, *Centrifugal compressors, *Fans, *Similarity theorem, Dynamic response, Harmonic analysis, Impellers, Sound pressure, Spectrum analysis.

For abstract, see STAR 1322

N75-31067/2GA PC$5.25/MF$2.25
Pratt and Whitney Aircraft, East Hartford, Conn.
Summary and Analysis of Performance and Stability Characteristics of the Refan Jt8d-109 Engine.
K. G. Sanberg, R. M. Mogielnicki, J. C. Davis, and V. M. Scaramella. Sep 75, 117p NASA-CR-134874, PWA-5284
Contract NAS3-17840

Descriptors: *Engine tests, *Noise reduction, *Turbofan engines, Altitude tests, Bypasses, Flight tests, Reliability engineering, Stability tests.

For abstract, see STAR 1322

N75-31068/0GA PC$12.00/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Aeronautical Propulsion.
1975, 476p NASA-SP-381
Conf-Conf. Held at Cleveland, 13-14 May 1975.

Descriptors: *Aircraft engines, *Conferences, *Engine design, Air pollution, Exhaust gases, Noise reduction, Technology assessment.

For abstract, see STAR 1322

N75-31449/2GA PC$4.25/MF$2.25
Aeronautical Research Labs., Melbourne (Australia).
Constant Volume Gas Turbine: A Detailed Thermodynamic Assessment.
M. Zockel. Oct 74, 51p ARL/ME-REPT-143

Descriptors: *Gas turbines, *Specific heat, *Thermodynamic efficiency, Combustion chambers, Combustion physics, Heat exchangers, Inlet pressure, Load distribution (Forces).

For abstract, see STAR 1322

PAT-APPL-612 899/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Jet Engine Air Intake System.
Patent Application.
N. E. Sorensen, and E. A. Latham. Filed 12 Sep 75, 21p NASA-CASE-ARC-10761-1
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Engine inlets, *Intake systems, *Jet engines, Engine design, *Patent applications.

An axisymmetric air intake system for a jet aircraft engine comprising a fixed cowl extending outwardly from the face of the engine, a centerbody coaxially disposed within the cowl, and means for axially displacing the centerbody within the cowl is described. The cowl and centerbody define a main airflow passageway. In one embodiment, a system for opening and closing the centerbody air inlet is provided by a dual-member centerbody, the forward member of which is displaced axially with respect to the aft member. In a second embodiment, the centerbody air inlet may be opened and closed by means of doors located in the forward wall of a unitary-member centerbody. The air intake system may also be provided with closeable air inlets located in the cowl wall which communicate with cowl auxiliary airflow passageways to provide auxiliary airflow to the engine. Closeable bypass openings are provided which allow control of the normal shock wave within the main airflow passageway.

21G. Reciprocating Engines

AD-A016 782/5GA PC$5.25/MF$2.25
National Bureau of Standards Washington D C
Feasibility Study for a Diesel Engine Condition Monitoring System for 1179 Class LSTs.
Final rept.,
D. Dominy, J. Frarey, H. Hegner, M. Peterson, and H. C. Burnett. 30 Jul 75, 104p Rept no. NBS-GCR-75-43
Prepared in cooperation with Mechanical Technology, Inc., Latham, N.Y., Shaker Research Corp., Ballston Lake, N.Y., General American Transportation Corp., Niles, Ill., Wear Sciences, Inc., Scotia, N.Y.,

Descriptors: *Landing craft, *Diesel engines, *Diagnostic equipment, Diagnosis(General), Maintenance, Inspection, Failure(Mechanics), Cost analysis.
Identifiers: LST 1179 class vessels, *Engine diagnostic systems, 3 M system, Failure analysis.

A study of the maintenance costs and practices on the LST 1179 class ship has been made to determine if a propulsion diagnostic system would result in cost savings to the Navy or other advantages. In the course of this study, a determination of the current propulsion system malfunctions was made and a listing prepared of the necessary sensor measures to detect these malfunctions. Based upon this information, a diagnostic system was proposed and costed. For the LST 1179 ships a simple data system, which measures the trend analysis parameters (plus critical malfunctions), was found to be cost effective. Its cost would be approximately $25,000 per ship per year.

COM-75-11396/9GA PC$5.25/MF$2.25
Mechanical Failures Prevention Group.
Feasibility Study for a Diesel Engine Condition Monitoring System for 1179 Class LSTs.
Final rept.,
M. B. Peterson, H. R. Hegner, J. L. Frarey, D. Dominy, and H. C. Burnett. Aug 75, 106p NBS-GCR-75-43
Contract C-5-35736
Prepared in cooperation with Mechanical Technology, Inc., Latham, N.Y., Shaker Research Corp., Ballston Lake, N.Y. and General American Transportation Corp., Niles, Ill. Sponsored in part by Naval Ship Engineering Center, Hyattsville, Md.

Descriptors: *Tank landing ships, *Diesel engines, *Diagnostic equipment, Landing craft, Marine surface propulsion, Failure(Mechanics), Maintenance, Cost analysis.
Identifiers: LST 1179 class vessels, *Engine diagnostic systems, 3 M system.

A study of the maintenance costs and practices on the LST 1179 class ship has been made to determine if a propulsion diagnostic system would result in cost savings to the Navy or other advantages. In the course of this study, a determination of the current propulsion system malfunctions was made and a listing prepared of the necessary sensor measures to detect these malfunctions. Based upon this information, a

diagnostic system was proposed and costed. For the LST 1179 ships a simple data system, which measures the trend analysis parameters (plus critical malfunctions), was found to be cost effective.

N75-31285/0GA PC$3.75/MF$2.25
Politecnico di Torino (Italy). Ist. di Macchine e Motori per Aeromobili.
Contribution to the Improvement of the Regulating Process of Ignition Controlled Engines Contributo al Miglioramento Della Caratteristica di Regolazione Dei Motori AD Accensione Comandata.
E. Antonelli, and G. Colasurdo. Jul 74, 50p
PUBL-165
Language in Italian.

Descriptors: *Automobile engines, *Energy consumption, *Fuel flow regulators, *Fuel injection, *Performance prediction, Boundary value problems, Butterfly valves, Graphs (Charts), Internal combustion engines, Numerical analysis, Pistons.

For abstract, see STAR 1322

21H. Rocket Motors and Engines

AD-A016 876/5GA PC$3.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Propulsion Directorate
Ignition Techniques for Studying Rocket Signature Effects - Smoke.
Technical rept.,
Robert E. Betts. 12 Aug 75, 12p Rept no. RK-76-4

Descriptors: *Target signatures, *Rocket engines, *Smoke, Rocket propellants, Exhaust plumes, Flash radiography, Infrared signatures, Radiofrequency, Ignition systems, Combustion, Rocket nozzles.

This report describes an ignition technique whereby rocket motor propellants may be evaluated for smoke production in a quantitative manner with no deleterious effects attributed by the igniter. This technique is also applicable to areas of rocket signature such as flash, IR, RF, and plume studies. The ignition technique is one in which the same propellant being investigated is ground burned at very high pressure with the resulting gases used to ignite the propellant being measured. (Author)

N75-31209/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
High-Pressure Oxygen Test Evaluations.
R. J. Schwinghamer, and C. F. Key. 29 Nov 74, 25p NASA-TM-X-64899

Descriptors: *High pressure, *Impact tests, *Metals, *Oxygen, *Space shuttles, Cryogenic rocket propellants, Drop tests, Impact testing machines, Lubricants, Sensitivity.

For abstract, see STAR 1322

N75-31215/7GA PC$6.25/MF$2.25
European Space Research and Technology Center, Noordwijk (Netherlands).
Catalogue of Propulsion Motors for Spacecraft.
R. L. Mory, and A. P. Findlay. 1975, 162p ESRO-SP-96-ESTEC
In English and French.

Descriptors: *Catalogs (Publications), *Liquid propellant rocket engines, *Solid propellant rocket engines, *Spacecraft propulsion, Europe, Japan, Manufacturing, Spacecraft launching, Spacecraft maneuvers, Supplying, United states of america.

For abstract, see STAR 1322

21I. Rocket Propellants

AD-A016 992/0GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Coulometric Measurement of HCl in Space Launch Vehicle Exhaust.
Progress rept. Jul 73-Jun 74,
Robert C. Legday, Richard L. Miller, and David C. Beatty. Sep 75, 18p Rept no. SAM-TR-75-27

Descriptors: *Hydrogen chloride, Exhaust gases, Colorimetric analysis, Plume detection, Solid propellant rocket engines, Air pollution, Monitoring, Launch vehicles.
Identifiers: *Microcoulometers, *Air pollution detection, *Rocket exhaust, Titan 3.

Large solid-propellant rocket motors release quantities of hydrogen chloride (HCl) gas as a product of combustion. Since HCl is a potential environmental hazard, the measurement of its concentration in the stabilized rocket exhaust ground cloud becomes important to validate diffusion estimates governing launch constraints, as well as to assess the biologic and ecologic impact of HCl reactions which may occur in the exhaust plume. This paper describes the development and test of a microcoulometer for detection of HCl in rocket exhaust, and presents analytical results from Titan III launch vehicle monitoring studies at Cape Canaveral, Florida, and Vandenberg Air Force Base, California.

22. SPACE TECHNOLOGY

22A. Astronautics

N75-31127/4GA PC$6.25/MF$2.25
Essex Corp., Alexandria, Va.
Role of Man in Flight Experiment Payloads, Phase 2.
Final Report.
M. Kirkpatrick, P. N. Frederick, and T. B. Malone. Jul 75, 159p NASA-CR-143939
Contract NAS8-30953

Descriptors: *Flight crews, *Man machine systems, *Payloads, *Performance prediction, *Spacelab, Computerized simulation, Monte carlo method, Space shuttles, Tradeoffs.

For abstract, see STAR 1322

N75-31128/2GA PC$4.25/MF$2.25
Essex Corp., Alexandria, Va.
Role of Man in Flight Experiment Payloads, Phase 2, Appendix a.
Final Report.
M. Kirkpatrick, P. N. Frederick, and T. B. Malone. Jul 75, 67p NASA-CR-143940
Contract NAS8-30953

Descriptors: *Flight crews, *Man machine systems, *Payloads, *Performance prediction, *Spacelab, Computerized simulation, Monte carlo method, Space shuttles, Tradeoffs.

For abstract, see STAR 1322

N75-31129/0GA PC$17.25/MF$2.25
European Space Research Organization, Paris (France).
European Capabilities for Space Applications. Volume 1: Presented Papers. Volume 2: Contributed Papers on Selected Topics of Communication Satellite Systems.
1975, 800p
Conf-Proc. Of the European Space Days, Noordwijk, Neth., 27-29 May 1975.
Partly in French; Partly in English.

Descriptors: *Aerospace industry, *Communication satellites, *Conferences, *Esro, *Esro satellites, *European space programs, Ground stations, International cooperation, Launch vehicle configurations, Mission planning, Project management, Satellite design, Spacelab.

For abstract, see STAR 1322

N75-31183/7GA PC$4.25/MF$2.25
Analytical Mechanics Associates, Inc., Seabrook, Md.
Program Selection, Modification and the Demonstration of a Baseline Trajectory Simulation for the Ldef Mission.
J. B. Eades, Jr., and H. Wolf. Jul 75, 70p NASA-CR-132726, AMA-75-20
Contract NAS1-13143

Descriptors: *Computer programs, *Mission planning, *Orbital launching, *Orbital space stations, Space shuttles, Trajectory analysis.

For abstract, see STAR 1322

N75-31206/6GA PC$6.25/MF$2.25
European Space Research Organization, Paris (France).
Theoretical and Experimental Studies of Annular Nutation Dampers.
W. Koeppen. Mar 75, 171p ESRO-TT-152, DLR-FB-74-06
Tran-Transl. Into English of "Theoretische U. Exptl. Untersuch. An Ringfoermigen Fluessigkeitsnutationsdaempfern", Dfvlr, Oberpfaffenhofen, West Ger. Report Dlr-FB-74-06, 1974. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 53.20 Dm.

Descriptors: *Annuli, *Nutation dampers, *Spacecraft stability, *Viscous damping, Dynamic models, Mercury (Metal).
Identifiers: Translations.

For abstract, see STAR 1322

N75-31525/9GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A Monte Carlo Analysis of the Viking Lander Dynamics at Touchdown.
R. J. Muraca, J. W. Campbell, and C. A. King. Sep 75, 56p NASA-TN-D-7959, L-9830

Descriptors: *Landing simulation, *Monte carlo method, *Performance prediction, *Viking lander spacecraft, Acceleration (Physics), Kinematics, Landing loads, Prediction analysis techniques, Soft landing.

For abstract, see STAR 1322

N75-31754/5GA PC$3.25/MF$2.25
Transemantics, Inc., Washington, D.C.
Life in the Universe and Man in Space.
N. Dubinin, and O. Gazenko. Sep 75, 13p NASA-TT-F-16563
Contract NASW-2792
Tran-Transl. Into English from Izv. (Ussr), 6 Jul. 1975 and Knizhoye Obozreniye (Ussr), No. 1, Jan. 1975.

Descriptors: *Aerospace medicine, *Bioastronautics, *Exobiology, Extraterrestrial environments, Extraterrestrial life, Human factors engineering, Manned space flight, Space flight stress, Spacecraft design.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31964/0GA PC$4.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.

The Space Activities of Spain.
D. L. P. Panduro. Sep 75, 52p NASA-TT-F-16545
Contract NASW-2790
Tran-Transl. Into English from Ing. Aeron. Y Astronautica (Spain), V. 26, Jul. - Aug. 1974 p 53-74.

Descriptors: *European space programs, *Ground stations, *Radio astronomy, *Spain, Cosmic rays, International relations, Lunar rocks, Sounding rockets, Technology assessment.
Identifiers: Translations.

For abstract, see STAR 1322

N75-31991/3GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
The Pioneer Projects: Economical Exploration of the Solar System.
J. R. Spahr, and C. F. Hall. Sep 75, 16p NASA-TM-X-62481, A-6255
Conf-Presented at Intern. Astronautical Federation 26TH Congr., Lisbon, 21-27 Sep. 1975.

Descriptors: *Pioneer space probes, *Solar system, *Space exploration, Costs, Management planning, Resources management.

For abstract, see STAR 1322

22B. Spacecraft

AD-A016 529/0GA PC$3.75/MF$2.25
Aerospace Corp El Segundo Calif Guidance and Control Div
A General Approach to the Shaded Sun Sensor Modeling Problem with an Application to the FLTSATCOM Shaded Sun Sensors.
Final rept.,
K. K. Wong. 25 Aug 75, 41p Rept no. TR-0076(6724-02)-1 SAMSO-TR-75-243
Contract F04701-75-C-0076

Descriptors: *Satellite attitude, *Solar cells, Spacecraft components, Position finding, Mathematical models, Computerized simulation.
Identifiers: Shades, Solar sensors, Spacecraft control, Satellite attitude control, Spacecraft position indicators, Solar position.

Sun sensors are widely used in space vehicles for sun acquisition or determination of body attitude relative to the sun. In order to alleviate undesirable reflections from the various parts of the vehicle, shades are often introduced about the sun sensitive device. The added nonlinearity in the attitude control system due to the effect of shading alters the stability margin and degrades the analytical results obtained from the linearized approach. A general approach is presented in this paper on the modeling of shaded sun sensors. The approach applies to shading wall geometry and solar cells whose boundaries can be described or approximated by a piecewise linear relation. The output of the cell, which depends on the sun angle and the shade dimensions, is a function of the intersection of the shade pattern with the cell area. Having defined the shade structure by vectors fixed in the sensor's coordinate frame, the shade contribution due to each partitioned shade structure is calculated sequentially so that it is not necessary to define an integral shade pattern and various boundary conditions.

N75-31008/6GA PC$3.75/MF$2.25
North Carolina State Univ., Raleigh. Mechanical and Aerospace Engineering Dept.
Development of a Computer Program to Use Experimental Pressure Measurements in the Calculation of Heat Transfer on Shuttle-Type Configurations.
Final Report, 2 Jun. - 15 Aug. 1975.
F. R. Dejarnette. 15 Aug 75, 28p NASA-CR-143476
Grant NSG-1191

Descriptors: *Computer programs, *Heat transfer, *Pressure distribution, *Space shuttles, Algorithms, Curve fitting.

For abstract, see STAR 1322

N75-31201/7GA PC$4.25/MF$2.25
TRW Systems Group, Redondo Beach, Calif. Management Engineering Dept.
Space Shuttle Configuration Accounting Functional Design Specification.
8 Feb 74, 64p NASA-CR-144405, TRW-23144-H001-RO-00
Contract NAS9-13140

Descriptors: *Configuration management, *On-line programming, *Space shuttles, *Spacecraft design, Computer systems programs, Data processing terminals, Design analysis, Spacecraft configurations.

For abstract, see STAR 1322

N75-31202/5GA PC$15.25/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Results of an External Tank Separation Test in AEDC/Vkf Tunnel B on 0.010-Scale Replica of Space Shuttle Vehicle Model 52-Ot(la17a), Volume 1.
R. H. Spangler, and J. J. Daileda. 9 Sep 75, 658p NASA-CR-141797, DMS-DR-2156-VOL-1
Contract NAS9-13247

Descriptors: *Aborted missions, *External stores, *Space shuttle orbiters, *Wind tunnel tests, Angle of attack, Graphs (Charts), Performance prediction, Scale models, Tables (Data).

For abstract, see STAR 1322

N75-31203/3GA PC$19.25/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Results of an External Tank Separation Test in the AEDC/Vkf Tunnel B on an 0.010-Scale Replica of the Space Shuttle Vehicle Model 52-Ot (la17a), Volume 2.
R. H. Spangler, and J. J. Daileda. Jul 75, 809p NASA-CR-141798, DMS-DR-2156-VOL-2
Contract NAS9-13247
Subm-Prepared by Rockwell Intern. Corp.

Descriptors: *Aborted missions, *External stores, *Space shuttle orbiters, *Wind tunnel tests, Angle of attack, Graphs (Charts), Performance prediction, Scale models, Tables (Data).

For abstract, see STAR 1322

N75-31204/1GA PC$15.25/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Results of an External Tank Separation Test in the AEDC/Vkf Tunnel B on an 0.010-Scale Replica of the Space Shuttle Vehicle Model 52-Ot (la17a), Volume 3.
R. H. Spangler, and J. J. Daileda. Jul 75, 663p NASA-CR-141799, DMS-DR-2156-VOL-3
Contract NAS9-13247
Subm-Prepared by Rockwell Intern. Corp.

Descriptors: *Aborted missions, *External stores, *Space shuttle orbiters, *Wind tunnel tests, Angle of attack, Performance prediction, Scale models, Tables (Data).

For abstract, see STAR 1322

N75-31480/7GA PC$6.25/MF$2.25
Grumman Aerospace Corp., Bethpage, N.Y.
Modal Coupling Procedures Adapted to Nastran Analysis of the 1/8-Scale Shuttle Structural Dynamics Model. Volume 1: Technical Report.
Final Report.
J. Zalesak. Jul 75, 175p NASA-CR-132666

Descriptors: *Computer programs, *Coupled modes, *Dynamic structural analysis, *Space shuttle orbiters, Eigenvalues, Eigenvectors, Finite element method, Ibm 360 computer, Scale models.

For abstract, see STAR 1322

N75-31529/1GA PC$3.75/MF$2.25
Southwest Research Inst., San Antonio, Tex.
Prediction of Payload Vibration Environments by Mechanical Admittance Test Techniques.
Final Report.
D. D. Kana, and L. M. Vargas. Sep 75, 40p NASA-CR-2591, REPT-02-3689
Contract NAS1-12402

Descriptors: *Mechanical impedance, *Payloads, *Space shuttles, *Vibration, *Vibration tests, Flexible bodies, Matrices (Mathematics), Rigid structures, Vibration simulators.

For abstract, see STAR 1322

N75-31531/7GA PC$4.75/MF$2.25
Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik der Luft- und Raumfahrtkonstruktionen.
Investigation and Further Development of Some Methods for Optimal Dimensioning of Support Structures Untersuchung und Weiterentwicklung Einiger Verfahren Zur Optimalen Dimensionierung von Tragwerken.
H. P. Miejnek, J. Buehlmeier, and M. M. Mai. Jul 74, 99p ISD-159
Contract RV-I-1-TC-3/72-B
Language in German.

Descriptors: *Spacecraft structures, *Structural design, *Supports, Cantilever beams, Convergence, Energy methods, Gradients, Structural weight, Trusses.

For abstract, see STAR 1322

N75-31941/8GA PC$3.75/MF$2.25
European Space Research and Technology Center, Noordwijk (Netherlands).
Materials Data Retrieval at Estec.
J. Dauphin, and B. Ryden. Apr 75, 32p ESRO-TN-120-ESTEC

Descriptors: *Data retrieval, *European space programs, *Spacecraft construction materials, Chemical properties, Outgassing, Quality control, Radiation effects, Remote consoles, Temperature effects, Thermal control coatings, Vacuum effects.

For abstract, see STAR 1322

22C. Spacecraft Trajectories and Reentry

N75-31177/9GA PC$3.75/MF$2.25
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Dynamic Analysis of the Long-Term Zonal Earth Energy Budget Experiment (Lzeebe) Spacecraft.
L. Meirovitch, and A. L. Hale. 1975, 33p NASA-CR-132716
Contract NAS1-10646

Descriptors: *Space laboratories, *Spacecraft motion, Computerized simulation, Equations of motion, Gravitational effects, Radiation pressure, Torque.

For abstract, see STAR 1322

N75-31178/7GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Fourteen Years of Resonance of Vanguard Orbits.
C. A. Wagner. Jun 75, 70p NASA-TM-X-70966, X-921-75-179
Subm-Submitted for Publication.

Descriptors: *Satellite orbits, *Vanguard 2 launch vehicle, *Vanguard 3 satellite, Geopotential, Orbit perturbation, Orbital elements, Resonance, Space surveillance (Ground based).

For abstract, see STAR 1322

N75-31180/3GA PC$3.75/MF$2.25
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Stopwatch Observations of Satellites, July 1974.
R. D. Eberst. 14 Aug 74, 27p ROE-STS-192

Descriptors: *Cosmos satellites, *Optical tracking, *Satellite tracking, Agena d rocket vehicle, Explorer satellites, Nimbus satellites, Skylab 1.

For abstract, see STAR 1322

N75-31182/9GA PC$4.75/MF$2.25
Texas Univ., Austin. Applied Mechanics Research Lab.
The Equations of Motion of an Artificial Satellite in Nonsingular Variables.
G. E. O. Giacaglia. Aug 75, 81p NASA-CR-143499, AMRL-1072
Contract NGR-44-012-269

Descriptors: *Artificial satellites, *Equations of motion, Orbital mechanics, Perturbation, Solar radiation.

For abstract, see STAR 1322

N75-31185/2GA PC$3.75/MF$2.25
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Kinetheodolite Observations Made at Earlyburn During the Observing Year 1964-1965, Part 12.
K. S. Russell. 28 May 74, 40p ROE-STS-183-PT-12

Descriptors: *Cinetheodolites, *Satellite tracking, Artificial satellites, Azimuth, Elevation angle, Great britain, Photographic tracking.

For abstract, see STAR 1322

N75-31186/0GA PC$3.75/MF$2.25
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Kinetheodolite Observations Made at Earlyburn During the Observing Year 1964 - 1965, Part 13.
K. S. Russell. 31 May 74, 36p ROE-STS-184

Descriptors: *Cinetheodolites, *Satellite tracking, Artificial satellites, Azimuth, Elevation angle, Great britain, Photographic tracking.

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Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Kinetheodolite Observations Made at Earlyburn During the Observing Year 1964 - 1965, Part 14.
K. S. Russell. 3 Jun 74, 35p ROE-STS-185-PT-14

Descriptors: *Cinetheodolites, *Satellite tracking, Artificial satellites, Great britain, Photographic tracking.

For abstract, see STAR 1322

N75-31188/6GA PC$3.75/MF$2.25
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Kinetheodolite Observations Made at Earlyburn During the Observing Year 1964 - 1965, Part 15.
K. S. Russell. 4 Jun 74, 34p ROE-STS-186-PT-15

Descriptors: *Cinetheodolites, *Satellite tracking, Artificial satellites, Great britain, Photographic tracking.

For abstract, see STAR 1322

N75-31189/4GA PC$3.25/MF$2.25
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Stopwatch Observations of Satellites, May 1974.
R. D. Eberst. 10 Jun 74, 21p ROE-STS-190

Descriptors: *Cosmos satellites, *Optical tracking, *Satellite tracking, Agena d rocket vehicle, Explorer satellites, Heos b satellite, Landsat 1, Nimbus satellites, Ogo.

For abstract, see STAR 1322

N75-31190/2GA PC$3.25/MF$2.25
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Stopwatch Observations of Satellites, June 1974.
R. D. Eberst. 10 Jul 74, 12p ROE-STS-191

Descriptors: *Cosmos satellites, *Optical tracking, *Satellite tracking, Agena d rocket vehicle, Explorer satellites, Heos b satellite, Skylab 1, Skylab 2, Skylab 3, Skylab 4.

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Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Kinetheodolite Observations Made at Earlyburn During the Observing Year 1964 - 1965, Part 18.
K. S. Russell. 7 Jun 74, 38p ROE-STS-189-PT-18

Descriptors: *Cinetheodolites, *Satellite tracking, Artificial satellites, Azimuth, Elevation angle, Great britain, Photographic tracking.

For abstract, see STAR 1322

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Academy of Sciences (USSR), Moscow. Inst. for Space Research.
Influence of Short-Periodic Variations of the Atmospheric Density on an Accuracy of Close Aes Orbit Calculations.
P. E. Elyasberg, B. V. Kugaenko, and M. I. Voiskovsky. 1974, 33p D-187

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Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Stopwatch Observations of Satellites, February 1975.
R. D. Eberst. 12 Mar 75, 25p 0ROE-SRS-1990

Descriptors: *Cosmos satellites, *Optical tracking, *Satellite tracking, Agena d rocket vehicle, Explorer satellites, Heos b satellite, Landsat 1, Landsat 2, Skylab 1, Td-1 satellite.

For abstract, see STAR 1322

22D. Spacecraft Launch Vehicles and Ground Support

N75-31184/5GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Wind Tunnel Investigation of a Centaur Standard Shroud Compartment Vent from Mach Number of 0.70 to 1.96.
A. L. Johns, and M. L. Jones. Aug 75, 91p 0NASA-TM-X-71759, 0E-8461

Descriptors: *Centaur launch vehicle, *Vents, *Wind tunnel tests, Aerodynamic loads, Air flow, Boundary layers, Discharge coefficient, Full scale tests, Static pressure, Supersonic wind tunnels.

For abstract, see STAR 1322

Descriptors: *Space laboratories, *Spacecraft motion, Computerized simulation, Equations of motion, Gravitational effects, Radiation pressure, Torque.

For abstract, see STAR 1322

N75-31178/7GA PC$4.25/MF$2.25
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Descriptors: *Centaur launch vehicle, *Vents, *Wind tunnel tests, Aerodynamic loads, Air flow, Boundary layers, Discharge coefficient, Full scale tests, Static pressure, Supersonic wind tunnels.

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